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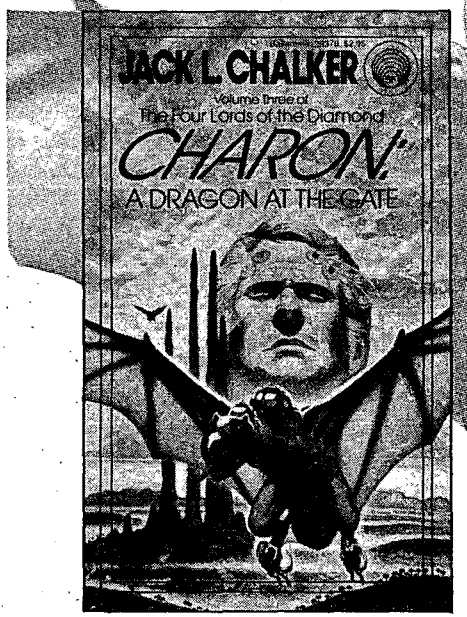

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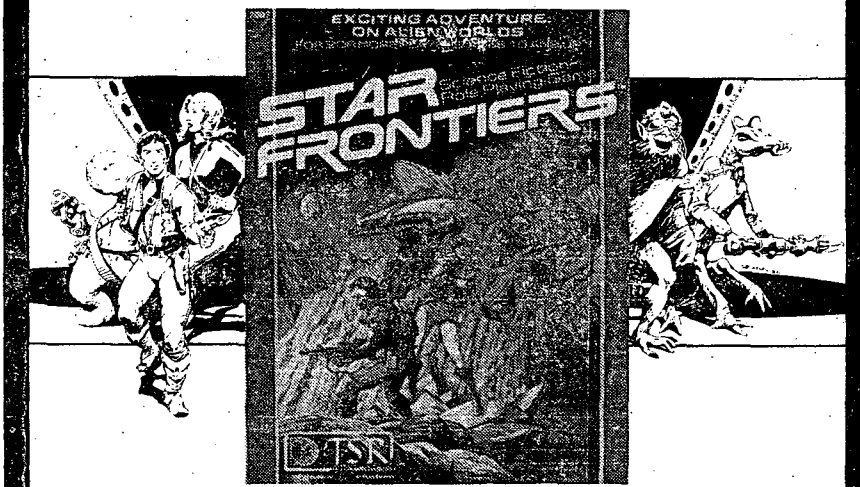

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Guest Editorial

CREATIONISM VERSUS THE LIGHTBULB

Stephen Goldin

The sinister aspect of the so-called creation science that has sprung up in our midst is not that it espouses Christian theology; after all, there are many scientists and theologians who can easily reconcile Christianity and science. The evil wrought by the neocreationists is far more subtle, in that they are trying to pass off fundamentalist doctrine under the guise of science. They've learned the language, as it were, and they're trying to con people into thinking they're being objective when objectivity is really the farthest thing from their minds.

All but the most rabid creationists are willing to concede that the *principles* of evolution are valid. After all, we've actually seen them in action. We've *seen* species compete for survival; we've *seen* some species become extinct because they can't adapt to changing conditions. We've also seen how some species adapt very well, and thrive because of it. Bugs that are immune to a given pesticide breed more of their kind, which means that new pesticides have to be developed every few generations. There is even, I'm told, a species of cockroach that has adapted to living exclusively in the backs of television sets.

Those principles are impossible to ignore. What we haven't seen directly, however, is the billions of years of evolution that produced the wide variety of modern plants and animals out of the protein-rich primordial seas; we've had to *infer* it from chemical, anatomical, and paleontological evidence we've discovered along the way. These are the weak points of evolutionary theory, and even experts admit they don't know all the intermediate steps from there to here. This is where the "creation scientists" attack.

Evolution is only a theory, they say. This is true. So is gravity. So is relativity. This does not mean you should step off rooftops or stand at ground zero during an H-bomb test. The word "theory" in scientific parlance means something quite different than it does in

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general speech, where it's often confused with "hypothesis," and the creationists make a big deal out of that popular misunderstanding.

The creationists offer a theory of their own. They state, based on their belief in Biblical scriptures, that the world is really only between eight and twelve thousand years old; say ten thousand as an approximation. They agree that some changes have taken place since then according to evolutionary principles, but that most of the species are pretty much as they were at the date of creation. It is their contention that our knowledge of geology, and the basis for radiocarbon dating, are inaccurate and have misled us. Within their own framework they have devised elaborate explanations for these things, and they can probably put up an argument that sounds rational.

But let's step *outside* their framework for a moment. After all, true science is not only internally consistent, but it must be consistent with all the other sciences as well. I would like to borrow a technique from one of the best science teachers I know of, James Burke, and take you on a series of connections. I apologize in advance if the following explanations seem oversimplified for the sophisticated readers of this magazine. The information is probably new to most "creation scientists," and I want to make sure they understand it.

Most modern-day creationists believe in electricity. I'm sure they have it in their homes. They assume that if they have a lightbulb that has not burned out, and they screw it into a properly wired lamp, and the lamp is plugged into the proper wall socket, and they turn on the proper switch, the bulb will glow. Electricity is a well-established phenomenon; almost every child in an elementary science lab gets to hook up a doorbell to a battery. Electricity is such a basic part of modern life that we take it pretty much for granted. While there are some phenomena related to it that we don't fully understand, we do know how to use its grosser properties for our own ends.

The behavior of electricity is derived from equations that are part of electromagnetic theory. (There's that word "theory" again!) We don't know everything about electromagnetism either, as physicists will gladly tell you, but the theory's equations correctly predict how electricity works in real life. To that extent, at least, the theory seems accurate.

The same theory of electromagnetism tells us that light is also a form of electromagnetic radiation. Photovoltaic cells in solar-powered apparatus make use of this relationship, and these solar cells work as predicted (though not as efficiently as we'd like them to, yet), so that connection also appears valid.

We can use the theory of electromagnetic behavior to predict how light should react under certain circumstances. For instance, light passed through a prism should be dispersed according to its various wavelengths, because shorter wavelengths are refracted differently than longer ones. Sure enough, this is the way it turns out, as anyone who's seen a rainbow can attest.

I don't mean to confuse you, but I'd like at this point to mention another the-

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ory—that of quantum mechanics. According to this theory, if atoms of a given element are excited, they will give off, or radiate, light at certain frequencies (thus tying the theory of quantum mechanics together with that of electromagnetics); similarly, if cool atoms of the element get in the way of light rays, they absorb some of the energy at the exact same frequencies. Both of these principles have been tested numerous times in the laboratory and have been shown to work, adding further weight to the theories that predict them.

We have thus developed the principles of spectroscopy, one of the major tools of astronomy. Applying this tool to observations of light from the sun, we learn a great deal about its chemical composition. From the theory of gravitation (sorry to slip another theory in on you unawares), we know how massive and how far away from us the sun is. (We think the theory of gravitation is pretty accurate, by the way, because it predicts with marvelous precision the speed of falling bodies and many other things that can be tested in a laboratory.) By measuring how bright the sun is, how far away it is, how massive it is, and what its chemical composition is, we have developed some pretty detailed theories—again, far from complete—about how it works. These theories enable us to make predictions based upon them, and the predictions appear to come true.

When we turn the spectroscope on the stars, we find that their light behaves very much like that of the sun. This leads us to the natural supposition that the stars are similar in some ways to the sun. Admittedly this is a large jump, but it seems at least consistent with what we know about the behavior of matter and light, as experimented upon in the lab-

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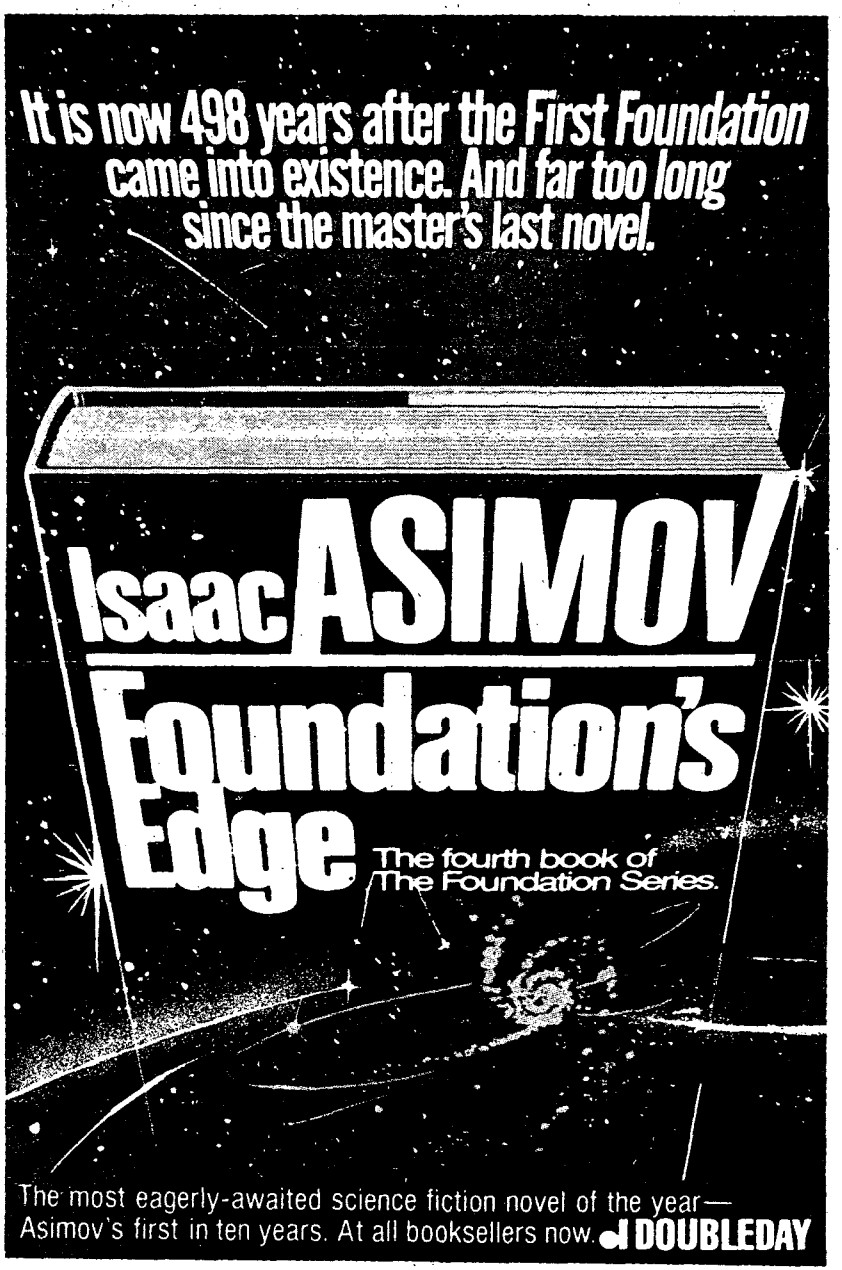
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oratory. (Remember that word "consistent"; I'll come back to it later.)

If the stars *are* other suns, then we know how bright they really are because they generate energy and light according to the same principles that apply to our sun. We can also measure how bright they appear to be. By a simple formula called the inverse-square law—again, easily verified in the lab—we can therefore tell how far away they are. It turns out to be very far indeed.

Astronomers have seen other objects in space, large groupings of stars called galaxies. These galaxies shine with the brightness of billions of stars, and again we can use the inverse-square law of brightness and distance to determine how far away they are. By using successive approximations, each built on the preceding step, scientists have been able to determine that some of the objects they're seeing are so far away that . . .

Wait a minute. Back to the good old electromagnetic theory, the one that predicts lightbulbs should work. That selfsame theory predicts that light can travel only at a finite speed. Yet astronomers, using methods based on the evidence I've explained, have witnessed objects so far away from us that the light from them, traveling at the finite speed, must have taken billions of years to reach us.

At last the point becomes clear. If, as the creationists claim, the universe is only 10,000 years old, how could light reach us from billions of lightyears away? When we look up at the nighttime sky, all we should be able to see is the comparative handful of stars that are within 10,000 lightyears of our solar system. Every year a few new stars might appear, but we should never be able to see vast stretches of the Milky Way, or the Magellanic Clouds, or the Great Nebula in Andromeda, or the Virgo Cluster, or . . . the list goes on.

We have gone from a simple, everyday phenomenon of lightbulbs, using theories that are repeatedly verified in laboratories, to the conclusion that the universe must be at least a few billion years old. (By refining the process, current theory estimates the universe's age at between ten and twenty billion years old. There are some diehard steady-staters who are ready to say it's even older than that, but this estimate will suffice for now.) This is in direct contradiction to the creationist assumption that the universe is 10,000 years old. Something has to give. Either we give up the creationist assumption or we give up believing in lightbulbs. Or else we have to find some explanation for why the difference exists.

A hardshell fundamentalist, at this point, might say that God created the universe with the light already on its way toward us, so that it only *seems* as though it's been traveling for billions of years. That makes me distinctly uncomfortable, because it means God is deliberately trying to fool us. Do you really want to worship a God who is a liar? Maybe He's doing it to test our faith. But if a God who can create a universe this enormous, this varied, and this complex still needs *our* respect, and is willing to play such cosmic tricks to test us, He must be suffering from some serious psychological maladjustments. Frankly, I don't want to believe in such

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a God, and I don't think any sane person wants to, either.

Ignoring, then, these irrational arguments, we return to the word consistency. This is where "creation science" fails to meet the test of *true* science. The creationists may have come up with arguments that sound internally consistent, but their assumptions are *not* consistent with everything we know about the other sciences.

Maybe the creationists are right, that the universe is only about 10,000 years old. But if they're going to convince *me*, they're going to have to redesign everything we know about astronomy, physics, chemistry, and engineering. That should keep them busy and out of trouble for a while.

And in the meantime, any scientific creationist who tries to argue his cause with me had better be prepared to explain scientifically why a lightbulb works. ■

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It is ridiculous to try to justify space development—or any other long-range high-technology program—by analysis of its costs and benefits. Twenty or thirty years from now, we will have scientific tools that we cannot even guess at. But a cost-benefit analysis by its nature confines us to use only what we know today or can be sure of in the future. Admit the uncertainties that exist beyond this generation, and the exercise becomes meaningless.

The great adventures of the human race must be justified by other and higher reasoning. Applying the principles of cost-benefit analysis, no one would ever fall in love, get married, or raise a family.

Charles Sheffield

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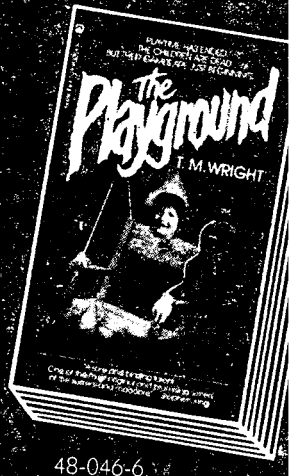

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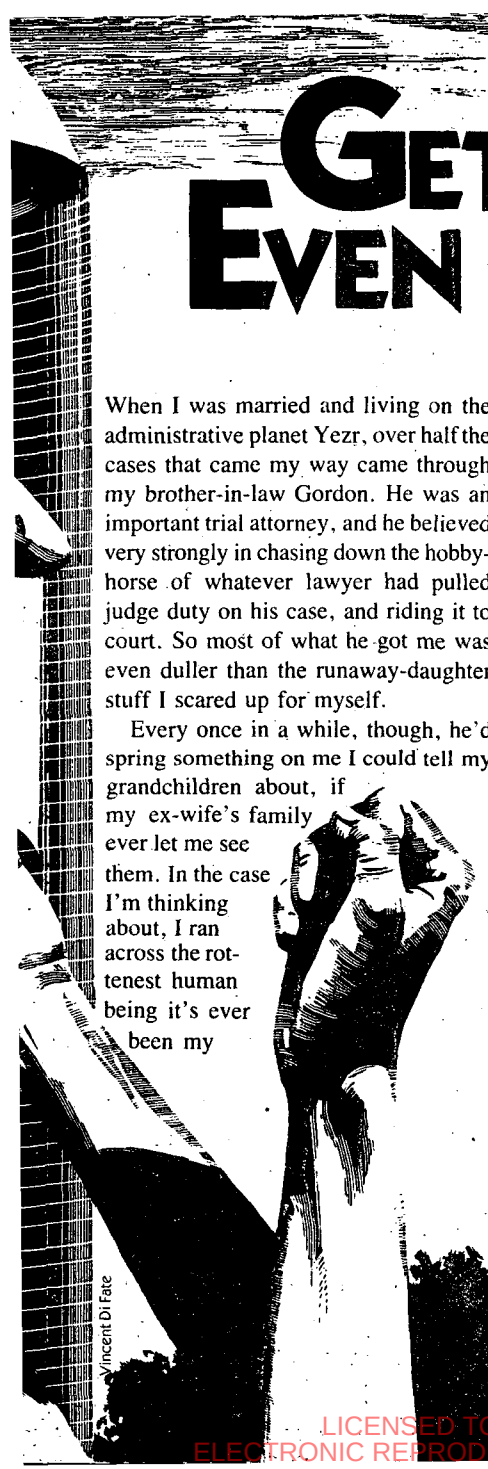
Ray Brown

GETTING EVEN

Genocide, obviously, is a far worse crime than mere murder. But the motives may not be as different as you'd think.

When I was married and living on the administrative planet Yezr, over half the cases that came my way came through my brother-in-law Gordon. He was an important trial attorney, and he believed very strongly in chasing down the hobby-horse of whatever lawyer had pulled judge duty on his case, and riding it to court. So most of what he got me was even duller than the runaway-daughter stuff I scared up for myself.

Every once in a while, though, he'd spring something on me I could tell my grandchildren about, if my ex-wife's family ever let me see them. In the case I'm thinking about, I ran across the rottenest human being it's ever been my misfortune to meet—maybe one of the most villainous of all time. I realize this pus in a bag of human skin had plenty of reason to keep itself hidden, considering the severity of the penalty awaiting it. Still, it could have written a letter explaining what had happened and snuffed itself and so have spared others needless pain. . . .



I'm getting ahead of myself. I'd better follow my notes on this one.

The case started in my home in New New Brussels, Yezr's capital, home of the bureaucrats. I had just stripped to go to bed when Gordon screened me and asked me to stop by his office in the morning to talk over the problems of a Miss Holt who, as he put it, was "going to be charged with murder and attempted genocide." He wouldn't say more over the screen.

This was interesting in a lot of ways. Genocide cases are extremely rare, for one thing. For another, the tense he put it in surprised me—I'm always surprised when a non-precog claims ora-

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cular powers, especially in a field as chancy as the law. And the future tense meant that the name of the judge hadn't been drawn yet, so Gordon had more interesting work than usual lined up for me.

Also—Gordon didn't take very many criminal cases, because there's usually not much money in them and they're a pain in the ass, besides. That meant somebody had to be spreading plenty of money around, and maybe I could charge a fee that would get me even on the losses from my past two cases.

So I was feeling pretty good the next morning when I sauntered into Gordon's waiting room and right through it past his mean secretary and the rows of chic, expensive Mum'k paintings. I missed something there—the gods were trying to tell me about the case I was getting into, but I'd seen the artwork so many times that I didn't pay attention. I just pushed my way through the office door and boomed "Hi, brother-in-law!" with a big grin on my face.

Gordon was sitting behind his desk screen, studying something. When I announced myself that way, he looked up at me like a mortician looks at the newly bereaved, and darted his eyes to my right.

My eyes followed where his pointed. Seated in the corner of the room, bathed in the unforgiving light of his big-executive window, was a pale, washed-out-looking young blonde lady, whose mouth seemed frozen in a permanent smirk.

"Mr. Pantara," Gordon said, "this is Miss Cassandra Holt. Miss Holt, Mr. Pantara, of Pantara Inquiries."

She nodded at me without saying anything. I adopted the mortician pose myself, feeling a little put out because Gordon hadn't warned me she'd be there.

"I'm sorry to hear about your trouble, Miss Holt," I said.

Still no response, just another nod. Maybe I hadn't blown it with that brother-in-law stuff after all. Her mind was definitely somewhere else.

I grabbed a chair and pulled it in front of Gordon's desk. "Perhaps we should discuss Miss Holt's problem a little more thoroughly," I suggested, trying to sound professional.

Gordon looked at his client, shrugged, and said, "OK, let's start by reviewing the background. You ever heard of the Clephs?"

"Not unless you mean bass and treble."

Gordon scowled at me and went on. "They're an aboriginal race on the planet Slapout. Slapout's a frontier planet—at the very edge of human space, in fact. It's run by the military, and the Clephs are on a reservation, like a lot of the aboriginal races. They're the victims of the crime of which Miss Holt will be falsely accused."

That would have got a rise out of anyone, you'd think. Not Cassandra. She just nodded.

I knew all the major races in human space, and I thought I knew most of the minor. Why had I never heard of the Clephs?

"Borderline sentience?" I asked.

"No," Gordon said, guessing the thought behind my question, "it's just that there aren't very many of them. As far back as records go, their habitat's never supported more than a couple

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hundred of them. The last census numbered them at 180 and now, of course, a lot of those have been killed. Fifty-nine, to be exact. Poison."

"What do we know about how it happened?"

"The police are still nosing around," he said, punching something up on his screen. "Let's see what we have so far . . . They were having their semi-annual boot polish festival. They ordered a cannister of the stuff twice a year from the Gored Ox Company. The new cannister had been tainted with a local bacteria that plagues the Cleph regularly and, had it not been for the fact that they had polish in reserve and 121 of them ate *that*, they'd all be dead."

"They *eat* boot polish?"

"They get off on it," Gordon said, smiling and keeping his face turned away from Miss Holt. "It seems the Cleph discovered that when some of the soldiers tried to hire them as valets. It makes them deliriously happy for about a day, then sick as a dog for a week. I guess the charge they get out of it is heavy enough to more than make up for the sickness—at least enough for them to eat it twice a year."

"Is there alcohol in that stuff?" I guessed.

"There is—but regular booze doesn't do that much to them. It may be alcohol acting together with something else in the polish, but nobody's ever funded an analysis of it. It doesn't do them any permanent damage, so why waste the money?"

"What kind of case is there against Miss Holt?"

"Well, first off, it's definite that the poison—the bacteria—was introduced into the polish within two days of the festival, and probably sooner. There's an army biochemist on Slapout who happened to know that the bacteria couldn't survive in that much alcohol for more than a couple of days. And it's not a place the bacteria would normally choose for a home, so it must have been put in on purpose."

"If it hadn't been for that biochemist, it would have been passed off as a bout of the plague," I said. I wasn't guessing.

"Right."

"Who had the opportunity to put the stuff in?"

"Four people, counting Miss Holt. The problems are that, first, she had more opportunity than anyone else. And, second, that she's the only one who had a motive. It's well known that she hates the Cleph. Everybody else seems to love them."

Miss Holt finally spoke.

"I wish they *had* all died," she said. "I'd go on Display with a song in my heart if they were all dead. They killed my little Delbert."

Have you ever met somebody who, as soon as he opened his mouth, you wanted to punch him in it? That's the way Cassandra affected me, and the way I suspected she got to everyone. Certainly Gordon was gritting his teeth just as hard as I was gritting mine.

Her voice said that she thought she was better than me and didn't have to have a reason—it was just the natural order of things. Her voice said that she was a parasite who thought the universe owed her a living. Her voice sounded like a toy siren. For a moment, I wished

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heartily that she *had* attempted genocide. It would have been perfect, somehow.

Gordon thought she was innocent, though. If he hadn't he wouldn't have been cutting an inquiry agent in on the money.

"It must have been a man who did it," Miss Holt droned on. "And did a half-ass job, like most men. No—he didn't even do that good. He didn't even kill half of them . . . "

When Gordon's jaw relaxed he said, "Will you excuse us for a few minutes, Miss Holt? I want to go over some of the documents in the case with Mr. Pantara—in the next room."

Gordon never went over the documents in a case with me.

"Well," she whined, "I certainly hope you and your *brother-in-law* can do something clever with them."

Gordon opened a side door and we passed through to a storeroom full of legal tapes. As I closed the door behind us he sat on a cluttered table and raised his arms and eyes to heaven.

"Now you can see why I'm sure she's going to be charged," he said. "And convicted, too, for that matter. How the hell am I ever going to convince a panel of judges that she's not the guilty party once she opens her mouth? Judges are only human, after all."

"Why do *you* think she's not guilty?"

"I'm not sure. Maybe because I'd like so much for her to be. Things never work out that nicely in the real world. Also, she was Administrator for Tourism for the Clephs, in charge of festivals and the like. The boot polish was her responsibility. Why would she be stupid enough to poison them with that?"

If she hated the Cleph badly enough maybe she wouldn't care, I thought. I didn't want to discourage Gordon from cutting me in, though, so I didn't share the thought. Instead I said, "Tourism? Who'd want to be a tourist on an Army planet?"

"Not very many people, I'm afraid," he said. "She had a real easy job. The Cleph haven't exactly made a big splash in the universe."

"A sinecure, eh?"

"You know these aborigines. They don't fit into our economy. They sit on a reservation. The government gives them food and medicine if they need it, but nothing else. Where's the excitement in that?"

"Doesn't sound very exciting for the aborigines, either."

"It isn't. The only extra money they get comes from the few tourists they do suck in, and from whatever 'native art' they can sell. They've got a sort of dealer who lives at the edge of the reservation—a Mr. Fallison—but I understand he isn't having much luck."

"He's one of the other possible suspects?"

Gordon made a face like he'd tasted bile.

"Theoretically," he said. "He and two others could have got into the shed where the polish was stored—but Fallison's so far behind in sales that the Cleph owe *him* money, on the advances he's given them. So, aside from the fact that he likes them, there's another reason for him not to want the Cleph dead."

"And the other two?"

His mouth got twistier. "There's Captain Wing. She's assigned to mon-

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itor Army-Cleph affairs. She's something of a scatterbrain, I'm told, who thinks the Cleph are cute. Doesn't strike me as the type. Then there's Romany, Slapout's one tourist. He may be your best bet—at least nobody knows much about him. But all this is hearsay, and most of it from Miss Holt. I need somebody on the spot if I'm going to come up with anything I can use to save her ass."

"Teleporting's expensive," I said. "And there are going to be other expenses on a case like this."

"No need to worry about that," Gordon said. "Her daddy is Holt Pharmaceuticals."

I was so impressed I tripled my fee, mentally. Then I had another thought.

"If she's one of those Holts," I asked, "what was she doing featherbedding on a place like Slapout?"

He sighed. "Eight years ago," he said, "she had this kid—her little Delbert—by someone Daddy didn't approve of. It was the last straw. She was . . . banished, I guess you could say, until she could turn into something resembling a human being. Of course, now that something of this magnitude's come up, the family's decided not to wait that long before they help her out."

I'd thought little Delbert was a pet. I couldn't imagine someone fathering a child on her. It takes all kinds, I guess.

"And she thinks the Cleph killed her son?"

"She says they drowned him. I don't know . . . you might look into that, too, while you're there. If nothing else pans out, I might make a plea for leniency based on that—not that it'll do

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any good, facing a charge like this one."

That bit of information almost made me feel sympathetic—until I passed through the office on the way out and listened to her tell me she expected results, by God, and she expected them quick.

I took a detour on the way home and walked down Jurvas Street, named after Tom Jurvas, who occupied the Display in the little park in the middle of it.

Genocide had been committed once before—maybe twice.

Forty-five years before, the Floragel, who had nuclear weapons, blew up their planet, presumably. Since the only Floragel off planet were the sentient females, that was the end of them. The causes for that incident had never been cleared up.

Five years after that it was the Mum'k, who never left their planet. There's nothing strange in that—there are many such races—but they were strange in other ways.

They exported a lot of different stuff—a plant that made a superior medicine for cancer control in several other races (not including humans, unfortunately); foodstuffs the deliciousness of which is now only a legend; paintings which, at the time, had only a small cult following but which are now widely sought after; diamonds of really superior quality (a consortium took over the hulk of the planet after the tragedy, and they're still mining those)—like I said, lots of stuff. Valuable stuff. Irresistible to the merchants.

The problem was that the Mum'k's idea of business was anything goes. They cheated foreign traders and, by all reports, each other, at every opportunity. (Whether the Mum'k themselves actually looked on their business practices as cheating is another, more complicated question. I heard it argued for hours at the extension course I took in Interspecific Coagency, and it never got resolved.)

Tom Jurvas was a trader who'd been rooked four times in a row and who apparently let it drive him crazy. He took a spaceship from the solar system nearest the Mum'k's—there were records. That was stupid because spaceships are always noticed. They're rarely used. Practically all they do is haul teleporting equipment to new planets.

Then he took a trip to the Mum'k's sun. He dropped a directed antimatter bomb into it. The star produced a spectacular solar flare that went over the Mum'k's planet like a blowtorch.

His defense was shabby but probably the best he could do, insanity being no defense at all in these cases. He claimed an astronomer had hired him to take him above the sun. The astronomer wanted to study some of its peculiarities close-up and then land on the Mum'k's planet, where he'd use Jurvas's knowledge of the place to help him trade and pay for part of the trip. Jurvas said he was asleep in his stateroom when the sun had erupted beneath them. He hadn't even known there was a bomb on board. The astronomer had mysteriously disappeared without paying his bills—and was never produced, of course.

There was a loud argument verging on a fist fight in front of the Display, between two groups of wide-eyed, earnest-looking young people. Members of

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both groups handed me pamphlets. I read them.

One group believed that the Mum'k had been the prime source of evil in the universe. Jurvas had nobly taken the sin of wiping them out entirely on himself. The comparisons with Christ were tediously drawn out.

The other group believed Jurvas was innocent, a lamb sacrificed by the Big Interests. Their defense was the same as Jurvas's, except that they'd discovered who the mysterious astronomer was. It was the current president of Yezr, of course.

I ignored their screaming and pushed through them to give Jurvas a closer look.

He still looked relatively young—maybe forty. His jet-black hair was graying a little, but the only lines in his face were lines of pain. His eyes were open. He blinked slowly, slowly.

An iron plaque on his pedestal said: TOM JURVAS, GENOCIDE and gave the details in smaller print.

I wondered if his punishment wasn't a little extreme.

Don't get me wrong—people like that are the absolute worst of humanity. What could be a filthier crime than killing off an entire intelligent species? It should be punished severely. Public execution sounds OK—maybe drawing and quartering, or boiling pitch, or the Bell Torture. There's a lot of suffering in those. But why draw it out for 250 years?

They'd put Tom in cold-sleep, then revived him just enough so consciousness came back, and maintained him in that state in the Display. Maybe I can sympathize with that more than most, having been through cold-sleep myself one time. Your biological processes and your perceptions are still slowed down about five times when you first come to. The outside world seems to be moving at about five times normal speed. But your thoughts, your awareness of the passage of time, they're hardly slowed down at all. And—have you ever let your leg fall asleep, then suddenly had to get up and walk somewhere? Your whole body aches like that.

Of course, that's not nearly enough pain to pay for the crime of genocide, so they wired his brain for extra pain. Just that crudely, with real wires, so everyone could see. They pumped all the pain through him he was capable of standing.

They put other wires in to flex and unflex his muscles, and tubes to take waste out and bring perfectly balanced nutrition in. They kept him *very* healthy. They wanted him to last a long time. Then they put him in the transparent case atop the pedestal, where he could watch the people come gawk at him and he could stand for five times his normal remaining lifespan as a Warning to All.

The penalty for attempted genocide was the same.

I pushed my way back through the crowd and continued walking home, mulling things over.

Maybe it was Miss Holt's plight, maybe even the pamphlets had something to do with it—but I started wondering, what if Jurvas really was innocent? After all, like Gordon said, judges are human, too.

The thought of someone—even someone as repulsive as Cassandra

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Holt—being sentenced to the Display innocent gave me cold chills. On the other hand, what if I got Gordon the material to make a good circumstantial case against someone else, and Holt was really guilty? How could you ever be so positive of someone's guilt that you could do *that* to them?

On the third hand—the Mum'k had had three of them—for genocide, you had to come up with a penalty that would satisfy the most vindictive races in human space.

An old Earth writer once wrote that where there's law, there's no justice. Maybe that was the problem. Maybe we should just turn such types loose. The vindictive races would find them, tear them limb from limb, and that would be that.

I fretted over it all the way home, but came to no conclusion.

The next day Cassandra Holt was formally charged. I got a call from Gordon.

"I want you to teleport out there today," he said. "They're going to shut the machines down after the cops come back, to isolate those people, keep them on tap for the trial. We're going to sneak you through as a tourist right before they do that."

"The cops think they have all they need, huh?"

"They never think that—but they're going to have to be satisfied with what they've got. This trial's being rushed through. They've already got the judges picked."

"So why didn't you send me out there yesterday?"

"I didn't think you needed to go till the cops were through."

"You don't think I break the law when I snoop for you, do you?"

"I don't want to know. I got a little more detail for you on the shoe-polish angle. The shed where they stored it was locked. Miss Holt had the keys in her possession most of the day, but left them hanging on a hook in the office at night. So all they've got there is that she had *more* opportunity to poison it than the others, not that she had the only opportunity. And the bacteria is common in the area. From what I can read between the lines on the police report, anybody could have made a culture."

"You want me to double-check you on that?"

"Yes, but don't waste a lot of time over it. What I want you to look for is a motive for one of those other three. They've all got opportunity and means, but they're saying Holt's the only one with a motive. If you can find somebody else with one, their case will break open."

"Hell, Gordon, *anyone* can have a motive. Just say one of those people is crazy."

"I'm afraid I'm going to need something a little stronger than that. Find me a good one, Pantara."

"Yes, boss."

"Find me something that'll convince a judge after he's listened to the stuff that comes out of my client's big mouth."

"Yes, boss."

The reception booth at Slapout was in a metal prefab office at the army base nearest the Cleph reservation. I got a nasty surprise there. I thought I was coming as a tourist, but the first thing

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I heard from the clerk was, "Oh! You must be the private investigator!"

"Inquiry agent," I muttered.

I was pissed off. I knew who was responsible—Miss Holt, gossiping with one of her acquaintances over the teleport message board. She and Gordon were the only ones who knew about me, and I knew Gordon wouldn't blow it.

I was so mad I almost got back into the booth and asked the clerk to send me home. Two things stopped me. One was the money and the other was the fact that it's sometimes possible to let being known as a professional snoop work to your advantage.

I swallowed my anger, put on a congenial, stupid face, and asked the clerk how I could get to the reservation.

"Ask around," said the clerk. "I'm sure somebody will be happy to drive you there in a rover. That's what the tourists do. There's not much excitement around here—usually."

I walked outside and sank ankle-deep in mud. There was mud as far as I could see, with a few tufts of gray grassy stuff sprouting out here and there. I turned around and saw the usual big ugly red ball hanging in the sky. I flinched.

I'm a statistical freak. I was born under a class G star, and live under a class F, so even though they outnumber everything else a hundred-to-one, those red dwarfs always take me by surprise. The life-supporting planets in their systems orbit so close they take up an enormous chunk of sky.

And you never expect them. When you look up in the sky at night, you only see a few of your stellar neighbors. Almost all the red dwarfs that are crowded in there are too faint to be seen.

Anyway, when I visit the planet of such a star, it takes a couple hours to cure myself of the delusion that the damn thing's going to fall on me.

Nervously, I asked around until I found an off-duty soldier who was bored with the usual pastime of getting drunk. He must have thought I was loony, the way I kept looking over my shoulder. He walked me to the motor pool, staying behind me all the way, as if he were afraid I might suddenly go violent.

He knew I was an inquiry agent, too.

When we'd slogged our way to the compound of rovers the soldier asked, "You want one with long stilts or short?"

Speed versus comfort. The longer the legs, the faster—and bumpier—the trip. I opted for speed.

"Good," the soldier said with a grin. "Then we can go right straight through Slime Lake. It sits square in our path. That's always a thrill."

I didn't find out if the base policy was to let the soldiers use the rovers for anything, or just to facilitate commerce with the reservation. It wasn't important. What was important was that the soldier went to the sergeant in charge of the motor pool and signed the rover out without either of them making a big production of it. It was something that was always done. That meant that when the records said nobody left the base on the night of the massacre, they were probably right.

I stopped considering the soldiers as candidates for an attempted genocide charge.

We climbed the ladder into the tallest of the rovers and set off on a jolting ride. My driver did a lot of twisting and

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dodging, but it wasn't just to harass a greenhorn. Out the windows I could see a lot of rivers, bogs, and lakes leading into and out of each other, winding everywhere.

I kept my mouth shut until we crossed Slime Lake. As we crossed we kept sinking lower and lower, until the waves were slapping against the bottoms of the windows and water was leaking through. At that point, I squawked.

The soldier laughed and said, "Everyone does that. Don't worry, this is as deep as it gets."

"Is it like this all over?"

"It is where it isn't ocean," my driver explained, "and except for this continent—about the size of Greenland on Earth—it's all ocean in this hemisphere. And this mud is everywhere, too. Rains like hell for two hours every morning."

The rover waded out of the lake, dripping slime, and I started bouncing again, harder than before. It's a good thing I only weighed 98 pounds on Slapout, or I might have broken something.

"How far is the reservation?" I grunted.

"About ninety miles—from the base, that is. Don't worry, we're almost there."

Five minutes later we lurched to a stop and he threw the ladder out. As I climbed down I began to get a sense of the actual size of the life on this planet. The area around the army base had all been cleared, and the odd perspective I got from the tottering height of the rover had fooled me. Living things on Slapout were *big*. The pulpy-barked trees were all the size of giant redwoods. As I gawked at them, an animal about the size of a yak raised a leg and peed on one of the trunks.

Something tapped against my back and I jumped.

I turned. The culprit was a short lady with fuzzy red hair, her forefinger still extended. She was beautiful. It wasn't a distant, touch-me-not beauty, either, but the kind that inspired instant lust. She had big friendly blue eyes. She wore a tight-fitting rust uniform that made me want to squeeze it, with captain's bars on the collar. She seemed puzzled by me.

"Are you the private detective?" she asked.

I didn't comment on her choice of words. I just nodded and said, "You must be Captain Wing."

"Thank God you're here," she said. "You can expose that misguided Lieutenant Dacre."

It was my turn to be puzzled. "Who?"

"You know, the biochemist over at the base. A fool. No sensible person would ever imagine Miss Holt could do such a thing. The bacteria got into the boot polish in an entirely natural way, don't you agree?"

She seemed sincere. My driver pulled up the ladder, grinned, and waved goodbye. The rover stalked away. My heart followed it.

I sighed and turned back to Captain Wing. "What makes you think so?" I asked.

"Well," she said, "the only other alternative is that one of *us* put the bacteria in, isn't it?"

"And none of you are capable of such a thing, right?"

The puzzled look came back. "Certainly none of the three residents. That

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Mr. Romany might have—I don't know him that well—but what reason could he have?"

What reason could any of them have?

I got directions from the captain to the guest house and thought it all through again as I found my room and unpacked. The whole case turned on motive. Cassandra Holt was in the mess she was in, basically, because none of the other three possibilities had any reason to want to hurt the Cleph. That was Gordon's opinion, and I agreed with him.

I had everything put away and had my pistol in my hand, trying to decide whether to conceal it or wear it openly, when a puffy red face peered around my open door.

"May I visit for a while?" it asked.

"Sure."

The rest of the body came into view—a big one, once muscular, but recently taken to fat.

"You are the private detective?"

I decided to wear the gun openly. If I'd had a trenchcoat, I'd have worn it, too.

"That's right," I said. "And you are . . . "

"Hale Romany," he said, easing himself onto my bed with a sigh. "Are they really closing the teleport down?"

"Yes. At least, they're not going to allow you to use it."

He sighed again. "That's all right for these other people," he said. "Their business is here. But I'm a trader. You can't trade if you don't go places. There's a prejudice against traders, did you know that?"

I nodded understanding. What I really understood was that it would cost the cops a lot of money and time to keep track of him.

"So," I said, "are you here on business?"

"Christ, no. There's nothing in this god-forsaken swamp. I came here for a vacation, if you can believe that. Shella, my stupid sister, came here a couple of years ago and she's raved about how wonderful the Clephs are ever since. And I believed her, so that makes me even stupider."

I couldn't resist. "You don't like the Cleph?" I asked.

"Oh, they're all right," he said, scowling at me, "if you like swimming competitions and folk art and enigmas. Next vacation, though, I'll visit the Droog and watch their ritual wars. Give me spectacle, every time. And if you're hinting what I think you're hinting, I might suggest that you'd have better luck investigating Captain Wing."

"Pardon? I don't understand . . . "

"Bah!" He waved his arms violently, setting all his fat quivering. "You understand perfectly. You hint that I am responsible for the Clephs' deaths. I tell you you're wasting your time with me, but you might not be with Wing."

"What makes you feel that way?" I asked. It struck me, not for the first time, that when I start an inquiry I work in a way very similar to the way a shrink works.

Romany shrugged mysteriously. "Women can get funny stuck out on an outpost like this, with only one man between them," he said. "And don't forget—women are devious."

He pushed himself off the bed with an "oof!" and walked out, wishing me a good day.

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When he was gone I sat on the bed myself, popped the pistol into the charger in my suitcase, and thought. Romany seemed to be suggesting that Wing and Holt were competing for Fallison. That was possible, but if he was also hinting that Wing had poisoned the Cleph to get rid of Holt, he was being absurd. How could anybody be jealous of Cassandra Holt?

More likely, Romany had tried to put the make on the sexy little officer, was rebuffed, and was indulging in a little deviousness himself. Still, I decided to check it out. It was *something*. I holstered my gun and went for a walk.

Everything at the outpost was built out of the local "wood" and hidden among the enormous tree-trunks. They had probably needed to chop down only one tree to make everything there. There were mud paths with plenty of roots and rocks to trip over leading from everything to everything else. I supposed they called it "rustic charm" in the sucker-bait they printed up for tourists.

My first stop was the supply shed. There was nothing for me there. The cops had cleaned it out.

I slogged on until I came to a little house with awkwardly carved wooden letters nailed to the door which spelled out: "Cpt Vivian Wing." I knocked. No answer. I hollered. No answer.

I tried the door. It was unlocked, so I went in.

Vivian was the arty type. The place was cluttered with low display tables, dramatically lighted, bearing fragile knick-knacks. I had to tiptoe everywhere. Tapestries hung all over the place. It smelled like mildew was starting to get to them. I didn't find anything good there, either. I didn't expect to, but you have to look.

I walked quite a while before I found "Fallison's Clephiana," a long, low building with a sign made out of the same hacked-out letters, only bigger. Everything else was set well back in the rustic charm area, but this place was on the reservation's only real road.

I walked around the place. It was maybe seventy feet long. There was a jeep on the road side and a private rover on the other. There were no doors along the length, but at one end was a fat dutch door with a printed "OPEN" sign dangling above it. At the other end was a porch filled with potted flowers leading to the only other door. I walked to that one and knocked on it.

I was answered right away. Captain Wing was still in that tight-fitting uniform. I thought cold-shower thoughts and said, "I'd like to ask you a few questions, Captain Wing, if you don't mind."

She was obviously tickled by the prospect. She giggled, opened the door wide, and yelled, "Hey, Alf, we got company!"

Fallison was the arty type too, naturally, but his stuff was of high quality and was displayed on wall shelves, so you didn't have to worry about stepping on it. The smell of some strange meat cooking came through the door that led from the gallery-living room, and through it stepped Alf Fallison, spatula in hand.

He shook mine with his free one and said, "Hi. You must be the private eye."

"That's right," I said. "I was wondering if you folks could help me."

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"Sure," Fallison said. He sat me in a fragile-looking, but very comfortable chair that looked like 18th-century Europe. This man had had money at one time. He and Wing took a loveseat across from me. Wing grabbed his hand and held it.

Romany was at least partly right, then. That was a surprise. Fallison looked too old for her—somewhere between an unusually robust seventy and a decrepit fifty. He had pure white hair and a flowing white moustache and looked like he was under a great strain. Wing probably thought he looked distinguished.

"How do you like it here?" I asked.

"It's wonderful," Wing said, beaming and giving Fallison's hand a squeeze. "The planet's beautiful."

Fallison, blushing, extracted his hand. "Don't forget the Cleph," he said.

"That's right," she said. "They're fascinating. And so charming! I hate to say this, but they're cute! There isn't another word for it. You'll see what I mean when you meet a few."

Nobody seemed very upset over the slaughter of almost a third of these charming creatures, but I decided not to go into that right then. Fallison got up, tossed the spatula through the door, and turned toward his shelves. There was a loud clatter in the next room.

I practically jumped through the door, saying, "Let me help. You go on with what you're doing."

I was in a measly little kitchen. The spatula had been aimed at the sink, but hit a pile of unbreakable dishes instead. They were all over the floor. I picked them up, working my way over to the next door. Wing and Fallison were still in the front room, so I stuck my head through. I saw an equally tiny bedroom with an open john on one side and no more doors. That was it. Riches to rags.

I walked back to the living room, where Fallison was getting something down off a high shelf.

"Artistically," he said, "the Cleph produce some of the most interesting pieces in the galaxy. Painted carvings are what they mostly do. This one is particularly striking. Of course, I've reserved this one for my own private collection, but there are pieces just as good in the shop. You could pick one up for as cheap as oz. 150." There was a labored eagerness in his face as he handed me what he took off the shelf.

It was a carved box, in the shape of a human being who was bent over backwards, its stylized face and body distorted with the strain of trying to push its way out of another, invisible box around it. It *was* striking. It was powerful. It touched some nerve I didn't know I had and made me sick when I looked at it, sicker when I touched it. The human's mashed face was the lid. I opened the box and looked inside and found something so disgusting I don't want to describe it.

I handed the box back to Fallison.

"Very interesting," I said. "Maybe sometime I'll give your shop a visit."

He sighed and put the box back in its place.

"Cleph art is, perhaps, an acquired taste," he said.

"I hear you've had some problems moving their stuff," I said. I tried to make it sound sympathetic.

"That's true. But there are a few buyers who realize the worth of these ob-

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jects. They're not numerous enough now to give me a decent cash flow, but their number will grow, mark my words."

"I hear you're not even taking the stuff on consignment."

"I am *now*," he said. "I have to. When I started, though, I was paying them large advances on everything. They still owe me over oz. 50,000."

Vivian Wing walked over to Fallison and put her arm around him. "Alf is a saint," she said, almost as if she were defying me to contradict her. "He's sunk an unbelievable amount of money in this place for a puny return, because he *believes* in the Cleph. Why, he used to be a very wealthy man."

"That's all in the past, Viv," he said, smiling. "And I didn't lose that much on the Cleph. I threw most of my wealth away before I ever got here."

"Well, you still have your art collection," she said. "We could show you some things. . . ."

"I don't think Mr. Pantara is interested, dear," he said. "And anyway, I don't want to dwell on the old days. Let's think about the future, instead."

He turned to me and said, "I believe you wanted to ask us some questions?"

I had already gotten the answers to most of them, but I didn't mention that. I asked, "How did you feel, personally, about Cassandra Holt?"

He shuddered. It was obviously involuntary. "A slimy sort," he said. "Still, I wouldn't have thought her capable of a crime like that."

"Did she ever try to, uh . . . get to know you?"

"No, thank God!"

I bought that, and came to some conclusions. Fallison was definitely out of the running. I'd never heard of anybody trying to kill someone who owed them fifty thousand ounces when there was no one to pass the debt on to. Captain Wing seemed to genuinely believe the Cleph were cute and cuddlesome, though I could do a little more checking on her. If there was anything on Romany in the past, the police were far more likely to pick it up than I.

It was beginning to look like Miss Holt might really be the culprit, and I remembered my promise to Gordon.

"She says that the Cleph killed her little boy. Could either of you tell me anything about that?"

Wing made a disgusted sound and said, "That's foolishness. She thought that boy could do anything, and she let him run wild. He got into one of the deeper lakes, where he was forbidden to go, and he drowned. There were some Cleph around watching, and Cassie thought they should have jumped in and saved him—but what do the Cleph know about human physiology? They thought he was just having fun!"

Fallison raised his eyebrows at that, but didn't comment directly. Instead he said, "Maybe you ought to ask the Cleph about it. They're hard to talk to, but it might be worth your time. There's a fellow who usually hangs out about a mile from here named . . ." He trilled a pitched conglomeration of consonants. "The name means Doesn't-Lie-Much. He was there."

"Is that a descriptive name?" I asked.

"We've never caught him in a lie," said Wing, "but I'm not sure how much that means."

* * *

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I found Doesn't-Lie-Much about a half-mile from where he was supposed to be, pulling himself out of a lake and shaking himself dry, spraying water for fifty feet. He was big, too—about ten feet tall.

Aside from his size, he was just as cute and cuddlesome as Wing thought he was. He looked like an enormous stuffed toy, vaguely otterish, with short, very soft-looking brown fur, a collapsible nose in the middle of his face, and a spare on top for breathing under water. As I was walking towards him, shaking off the water he'd shook onto me, the front nose popped out like a balloon.

"Good afternoon, little man," he said in a booming contralto. "I hope you did not find my water unpleasant."

"Not at all," I said, pleasantly surprised. There were very few races that spoke human languages understandably, and those that spoke with grammar-school perfection were rare, indeed.

"Then perhaps you would disjoin from smelling such cunningly seasoned meat."

I did a double take as I realized how foolish I'd been to be encouraged by his mastery of the language. Just because he spoke it perfectly didn't mean he had to make sense.

In fact, our whole conversation was filled with comments which one side or the other didn't understand, most of which I'm going to leave out. I never was sure how well we were communicating at any time, and it's possible that we never really "understood" each other at all.

Luckily, you don't have to understand a sentient creature to deal with it.

When men were first contacting all these alien races, the academics were in despair. Most of them figured that since their psychologies were so . . . well, *alien* . . . there was no hope of ever learning to cope with them. Meanwhile, of course, thousands of human traders were spreading through the galaxy and doing a fine job of coping. When this phenomenon was pointed out to these scholars, they naturally denied its existence, but the *next* generation of scholars named the phenomenon "Interspecific Coagency" and started to study it formally. They did a pretty good job, too.

I deal with lots of strange races in my line of work, so I took an extension course from Yezr University in this little-known science. I memorized the beginning of the preface to my textbook. I use it as a kind of litany in cases like this, to get my mind clear:

The study of interspecific coagency is the study of purposeful behavior expressed through action, and nothing more.

Don't confuse action with preference. It's true that when a sentient being expresses a wish or hope it's engaging in a kind of action, but don't confuse it with the action to which it refers.

Action is what each being employs to bring about a condition more suitable to it. *If a being were perfectly satisfied it would do nothing. What's more, it would do nothing if it thought purposeful behavior didn't have the power to change the state of its affairs.*

Beings moving toward a more suitable state are our concern, then. The others are all dead or beyond our perception. But the sentient being studying interspecific coagency must not confuse

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"suitability" with its own idea of "happiness," assuming it has one. Our method is aprioristic and tautological. The acting being moves toward what is "suitable" and away from what isn't, and the "suitability" of something may be judged by the tendency of the being to move toward it. And remember: suitable to it.

I had to run that through my head a lot while I was talking to Doesn't-Lie-Much. He was continually sucking me into trying to make a man of him, then slapping me in the face with another non-sequitur. It took me ten minutes just to make sure of his identity.

After that things went a little quicker. I asked him about the death of little Delbert.

Doesn't-Lie-Much took a seat on the bank with his back against a trunk. His paws splayed out into webbed hands and he produced a folding knife from what must have been a natural pouch. He picked up a dead branch and began to whittle. He answered slowly, with a lot of carving in the pauses.

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"The female man named Holt," he said, "was very disturbed by us after the child's death. So it must be true that we are guilty of some impropriety that we're not capable of understanding."

"But what happened?"

"There were twenty-one of us, seated, much as I'm seated, around a lake, much like this lake—exactly like this lake, in fact, except that the time was different. The child was a terrible swimmer. We had explained this to him, so we knew he knew this. The child waded out to where the bottom drops off, and then began to flail about in a most amusing manner. Prior to this time, we had always thought the child a miserable little creature, entirely humorless."

"And then?"

"Nothing. We waited for the child to finish his performance."

"Didn't you know that the 'finish' would be when he died?"

"Of course we knew. Do you think we're stupid?"

"You don't think there's anything wrong with letting him die?"

"I'm sorry, I don't understand."

We ran that one around quite a few times before I gave up. Maybe Gordon could make a tearjerker out of it, but I doubted it. It would be difficult to bring off even if Holt were charged with an ordinary crime. There was no way of telling it that didn't make her look like a lousy mother.

Lousy mothering and attempted genocide weren't the same thing, though. I still had to dig for a way to save her, just in case she didn't do it.

Or even if she did, for that matter.

"How was it," I asked, "that you had so much spare boot polish around the day so many of you died?"

"The men in charge of this place never give us enough at one time to have a truly satisfactory experience. So several years ago we began sneaking a little out at each festival and saving it, so that during at least one festival we could have enough."

"Why didn't you just ask them to order more?"

"We did, but that was after the child's parent took a dislike to us. She was in charge of such orders."

"It's lucky for you that you decided to eat your reserve on the night you did."

"I'm sorry, I don't understand."

"If you hadn't made that decision, you would all have eaten from the poisoned cannister. You would all have died."

"Yes?"

"Yes!"

He carved for a long time quietly, then said, "You have said something that is obvious. I thought you were going to draw a conclusion from it, though I can't imagine what it would be."

"I suppose the conclusion is that it would have been a bad thing."

"No," Doesn't-Lie-Much said, flatly.

"It wouldn't?"

"That is my meaning."

"Someone slipping bacteria into your boot polish doesn't bother you?"

"It was a good joke," he said. "Very amusing."

I ran through my litany again, and phrased my next question carefully.

"What you call amusement—is this something that you seek out? Do you try to be around amusing things?"

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"Yes."

"Are jokes something that always provide amusement?"

"To a greater or lesser degree."

"I'll be damned."

"I'm sorry, I don't understand."

"Never mind. Do you understand about the bacteria that causes a plague among you occasionally?"

"Yes. Some men from your army explained it to us."

"How easy is it to find?"

"It is all around us. There is some in this very lake, though not enough to make us sick. Sometimes, though, it becomes concentrated. The bacteria start breeding faster than usual, for some reason not understood."

There was nothing in that for me either, then. No special know-how was called for. Anyone could do it. Make a culture of the bacteria, and it would *be* concentrated.

I sighed, shook my head, and started to say goodbye to Doesn't-Lie-Much when the memories of my old textbook gave me an idea for another approach.

"If you knew who was responsible for killing fifty-nine of you," I asked, "what would you do with that person?"

"Nothing," he said. "You little men have your own system of dealing with it."

"But if it were in your power to do something?"

"I am not sure," he said. "We would have to discuss it among ourselves for a long time. Whether we did anything or not would depend on whether we could invent a sufficiently funny joke to play on that person in return."

I thought about the Cleph's last comment on my long walk back. It was tempting to think that the "joke" they'd play on the guilty party would involve a painful death, but that was putting man-thoughts in a Cleph head. Like as not, a whoopee cushion would satisfy them.

It was discouraging. Now I saw why the people here couldn't get themselves upset over the case, and I was starting to feel the same way. If the Cleph didn't give a damn whether they were killed off or not, why should I? I didn't want the responsibility of putting someone in the Display in the first place. Now I was even more unsure. Like a refrain, the thought kept coming back to me: *The worst possible crime demands the ultimate punishment, but some punishments are more ultimate than others.*

Of course, it would be worse if an innocent person were sent to the Display. I *had* to work on the case, to do my utmost to make sure, at least, that that outrage wasn't committed.

Then again, it was looking more and more like they had already charged the right person.

Crazy ideas occurred to me. I would establish Cassandra Holt's guilt, return to Yezr, and bust her out of jail. I would establish someone else's guilt, mercifully kill them, return to Yezr, and bust Cassandra Holt out of jail.

I was almost raving by the time I got within sight of "Fallison's Clephiana." When I saw that smidgen of civilization I calmed down a little. Human beings might see me. They would expect me to behave in a certain way.

I passed Fallison's living quarters and circled into his shop. He was there, sitting on his counter facing the front door,

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peeling gummed labels off his objets d'art and switching them around.

"Did you find Doesn't-Lie-Much?" he asked.

"Yeah." I still felt wicked. I walked through a little swinging gate at the end of the counter and down to a shelf that lined the back wall. The shop wasn't big. A few steps took me there. I pretended to study some of the less upsetting carvings.

"Surely," Fallison's voice said, "you haven't developed a liking for Cleph art this quickly. What did you come here for?"

"I'm not sure," I said. "Are these all supposed to be the Cleph idea of a joke?"

"Ah! You talked about that, did you? You're right—the Cleph don't have a concept of art, *per se*. They just have the idea of 'amusement,' whatever that might mean to a Cleph."

I spun to face him, but he hadn't even turned around.

That didn't seem normal to me. After all, I might break something. If I were a suspicious person, I'd have thought he was going out of his way to convince me he wasn't interested in what I did—that there was nothing there to hide, and since I'm paid to be suspicious, I decided to keep it in mind.

"Do human beings buy these things?" I asked.

"I already know you don't like them, Mr. Pantara. There's no need to be nasty. And yes, what few customers I have are mostly human. Humans are the biggest art-buyers in the galaxy."

"They must be real sickos."

He finally turned. His face was red.

"That's what they used to say about people who liked van Gogh," he said, spitting it through clenched teeth. "I don't know why you're trying to provoke me, but you've succeeded. If you're not going to buy anything, get the hell out."

"I'm sorry," I said. "I was just fishing."

He said nothing. He just pointed a shaking finger at the door.

It was dusk by the time I got back to the guest house. I'd put in a hard day's work and had no information to show for it but that Wing and Fallison were lovers, the Cleph were weird, and Fallison had something to hide. That last was iffy, but he'd kicked me out at the first opportunity—as soon as I said something he could get mad at. A normal art dealer in that position, I thought, would have given me a half-hour lecture on cultural relativism instead. Sure, there were lots of other theories that might account for his behavior, but I wasn't interested in those. I had to have something to investigate, after all.

What could Fallison be hiding?

I passed Romany on the way in. He was carrying an official-looking gray tape tray and looking very pleased with himself and maybe a little drunk. He grabbed me by the arm.

"I'm leaving this mudball," he said. "They won't dare hold me much longer. I have a petition here, addressed in the strongest possible terms to the superior court at New New Brussels. Mr. Fallison . . . have you met Mr. Fallison? A very cultured gentleman . . . he's taking me to the teleport message board tonight. In his private rover. It won't be much longer."

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He offered me his hand as if it were goodbye forever. I must have let my skepticism show, because he said, "You only doubt me because you're not acquainted with all the facts. I have pull. My paternal uncle is very high in the teleport guild, very high indeed. I pointed this out in my petition."

"Well, I wish you luck." I shook the hand and bit my lip.

"Thanks. You want to come with us? They keep all the good booze on the base. The stuff here will rot your insides out."

"I'd really like to, but I'm beat. I've got to sleep."

That was the truth. I pushed my way past him into my room. My closet door was open, the clothes rearranged. My room had been searched. I didn't give a shit. I passed out fully dressed on my bed.

Maybe the fact that my room had been searched played in the back of my mind, telling me I was right—there had to be something funny going on. Maybe it was just the odd effect of the unfamiliar gravity. Maybe it was genius. Whatever it was, I jumped out of bed two hours after I hit the sack, my mind burning with an Idea. I nurtured it carefully, like a flame in a strong wind, making sure I didn't forget it while I got unfuddled and fully awake.

After I sprayed a lot of cold water on my face I checked it out. It still seemed good.

Fallison's living quarters were puny—just the three rooms in a row, then a wall. The shop was even smaller. In that seventy feet of building there had to be something in between. Fallison *had* been hiding something. Literally. Physically. It might have nothing to do with the case, but as long as Fallison was going to be chauffeuring Romany around tonight anyway, it would be next to sinful not to check it out.

I measured the charge in my pistol and took a walk in Slapout's moonless night.

There were no lights on in Fallison's place when I got there, unless the windows were well shuttered. I walked around, but couldn't hear anything.

I broke into the "Clephiana" end, if you can call a few seconds of jiggling the lock breaking in. My eyes had adjusted to seeing in starlight, but the murk inside was harder to deal with. Still, I managed to fumble my way to the back without knocking anything over.

I felt along the back shelves for some kind of hidden door. It turned out to be simple—there was a shelf without anything on it, so I figured that had to be a clue and I slid the shelf along the length of the wall. When I slid it to the left it moved and pulled out of a niche in the right wall like a latch. The whole row of shelves started to swing in. Artificial light streamed out of the hole. I pulled my pistol loose and went in.

I'm not sure what I expected to find—surely nothing as obvious as a lab with bacteria cultures still growing in it, but something a little more sinister-looking than what I found.

It was a room full of art.

Well, Pantara, you dummy, what did you think an art dealer would stash away?

I figured it must be more of his private collection. There were a few Cleph

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items, but mostly it was Mum'k art. Exquisite paintings, some would have called them. At least they were exquisitely expensive. There were also a few Floragel items.

There was also Captain Wing.

She was dressed in a negligee, seated in a ratty lounger built for comfort, holding up a painting, staring at it. "Hi, Alf," she said.

I holstered my gun and said, "It's only me, Captain."

She put the painting down carefully and looked up. "Gee," she said, "I thought Alf and you had a fight. It's nice to know you've made up. Honestly, though, I don't know when he'll be back."

"That's OK," I said, taking a seat on a couch and crossing my legs. "I'll wait."

I stared at her a while, full of lust and respect. Alf had to have asked me in for a visit, or I wouldn't have been there. She was truly guileless. She really expected the best from people. The only explanation I could come up with was that she was raised on the frontier and had never left it when the Army started shipping her around. And the Army wouldn't mess her up—whatever you say about the Army, the people in it usually play it pretty straight with each other. Art was probably her only contact with "high civilization." I wished they made more like her, then changed my mind. I wouldn't get nearly as much work.

"Can I get you something?" she asked.

"No, thanks. When the police were combing through the outpost, did they find this place?"

"Of course," she said.

Of course. And, of course, they wouldn't make anything out of it. It had nothing to do with the genocide. There must have been a million ounces' worth of art there. Anybody with a grain of sense would keep it hidden. I was stupid, looking for physical evidence when the whole case hinged on motive. There was no motive here.

Wait—maybe there was.

A horrible, very convincing Idea occurred to me. That meant I'd had two Ideas in one night! I felt like an old man with a gonad transplant.

"How well do you know Alf, Captain?"

Her eyebrows raised at that. "Well enough to know that you shouldn't be suspicious of him."

"How long have you two been close?"

"Almost from the time I came to Slapout—three years ago. I don't have to answer these kinds of questions, you know."

"You don't have to answer any kind, Captain, though you might save yourself a lot of grief if you did. But let's talk about art, instead. I'm a philistine, myself, but I do know that these things are worth a lot of money. Am I right?"

She nodded, sulkily.

"How long has Fallison had these things?"

"He hasn't been doing anything illegal. He's had them for years and years, back from the time when he was rich."

"How did he get rich in the first place?"

"As an art dealer. Some people have an eye for art, you know—although, to

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be fair, I guess Alf had a lot of luck, too."

"Hey, Viv," a voice came from the wall, "surprise! The court wasn't impressed by Romany's uncle."

Fallison came through unarmed, thank God. He spotted me and flushed.

"What the hell are *you* doing here!" he yelled.

Wing was aghast. "You mean you came in here without even being invited!"

"I'm afraid so," I said.

"Next time I'm at the base," Fallison said, "I'm going to have a warrant issued for your arrest. You're no cop!"

I pulled my gun out and pointed it at him.

"Close the door behind you," I said. "Then take a seat over there by Captain Wing."

His face went from red to fishbelly white in a second. It was gratifying to watch. He did what I said.

"Oh, Alf," Wing said, "this is terrible! This man seems to think you're some sort of criminal!"

"You don't have to talk . . . "

I burned a hole in the chair next to Alf's head. "Shut up," I said. "I'm talking to the Captain."

She looked at me almost pityingly. "I don't have anything to say," she said.

"Lady," I said, "I'm not going to hurt you. I need your testimony. If I'm guessing right, you'll be glad you gave it. If I'm guessing wrong, Alf can have me thrown in jail, and they'll take my license away."

She kept her mouth shut.

"I don't *have* to hurt you," I said. I burned a hole in about oz. 20,000-worth of painting. "I'll just keep doing this."

I aimed at another one.

"You were talking about Alf's luck?" I prompted. "As an art dealer?"

She stared in horror at the burned painting, then looked back at me. There was pity in her eyes now—pity and fear and tears.

"It's not anything like what you think," she said. "He just happened to have a great deal of Mum'k art in his possession when the race was wiped out."

"And?"

"Well, when that happened, the prices skyrocketed, of course. The same thing happened just five years before, to Floragel art when they were wiped out. It's not an uncommon phenomenon. Even back on old Earth, when an artist died, the price of his work would often shoot up. Jackson Pollock is an example. Or van Gogh."

She still didn't get it. Her eyes were wide and pleading.

Fallison was looking at her as if he'd like to slit her throat, but it was too late for that to help him.

When they released Cassandra Holt, her daddy sent me a fat check. She never even thanked me.

The authorities on Yezr put Interstellar Credit's best skip tracers on the job of following Fallison's life backwards. At forty years before, they had him on the Mum'k's planet, buying every painting he could get his hands on, then disappearing a few weeks before the solar flare wiped them out. An old guy who had worked at the spaceport on the next system over remem-

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bered him hanging around—he was so distinguished-looking. After a month, the authorities had a pretty good case against him.

Tom Jurvas couldn't testify, of course. When they took him out of the Display he was a twitching, drooling mess. The government PR men put out a lot of horseshit about how they were going to fix him up, make it all up to him, but I never read a follow-up boasting of their success. There's nothing you can do to help a man who's been through that.

When they put Fallison in the Display, I was one of the crowd in the park watching. I brought a jug of wine and I drank a toast to Vivian Wing. If she hadn't been so beautiful and guileless, Fallison would probably never have been sucked into bragging about what a clever art dealer he was. Then they plugged the wires into his brain and I cheered along with everybody else.

It wasn't the genocides that brought out the beast in me, of course. The Cleph are probably still telling their children about what a card old Alf Fallison was. The Mum'k were wiped out before they knew what hit them.

But if there is a worst possible crime, and it gets you the ultimate punishment, then there is necessarily a worse-than-worst possible crime. And what that is, is committing the worst possible crime and then letting somebody else suffer the ultimate punishment for you. The Mum'k got off easy. Tom Jurvas took all the hell modern technology could contrive for forty years.

It made me feel good, to see those wires clamped on Fallison's head.

It wasn't until I got home afterwards that I felt dirty, and I was just crazy enough to be mad at Fallison for it—for making me enjoy seeing that done to someone.

The Jurvas-Fallison mess made a lot of people feel dirty.

Not long ago, a couple of kids called on me, representing a little group that was working to put an end to the Display. They pointed out what I'd already noticed—that Fallison made you feel good about it, and that made the Display an even more corrupting influence than it had been. The one who did all the talking told me he wanted me to join their group.

"How come?" I asked.

"Frankly," he said, "for your publicity value. We think you'd bring a lot of people around. Think of the good you'd be doing them. It's like . . . it's like you're cleansing your soul when you work against the Display."

"In all honesty, I can't join, kid."

"Why not? We've heard you're sympathetic."

"In a way I am—but when I think about Jurvas, I still feel good about Fallison being in there."

"I don't believe it."

"It's true. For consolation, I think to myself that even though I'm a savage, at least I'm not as savage as the government. They want to use the Display to punish genocide—I just want to use it to punish letting an innocent man take the rap for you in the Display."

"That's illogical. Fallison couldn't have done that if there hadn't been a Display in the first place."

"You're right. But when I picture Jurvas in my mind, I don't care about any of that."

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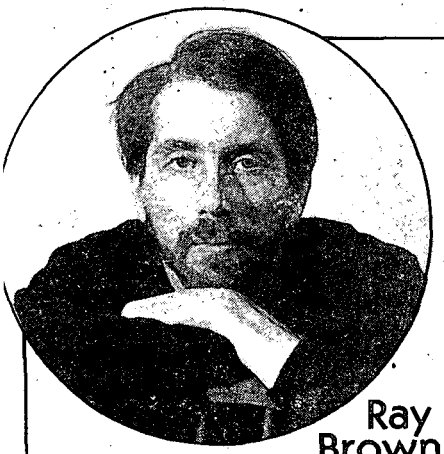
The kid got upset and started waving his literature. "You're letting your whole society down!" he yelled. "The Display is the most barbarous part of us. We can't advance spiritually as long as we've got it."

"I'm sorry, kid," I said. "But now that you know about me, you can see that I've still got some work to do on my own soul. When I get to be a saint, then maybe I'll start worrying about other people's." ■



Ray Brown

● Ray Brown is self-educated, much of this achieved at the Ohio State University library while taking courses for a B.A. in Music Theory. Torn in the dichotomy of learning what is germane and useful versus securing a credential to flash before administrators, Ray decided to satisfy both areas.

With a degree in one and wide knowledge in the other, Ray feels Art and Science form a duality in which there is not so much tension as there is complement. His particular bent in the sciences led to the study of mathematic systems predating the use of Arabic numerals. Further researches into number theory, symbolic logic, and complexity theory led Ray to the idea for a new field of social study showing how bureaucrats and academics use mathematics to give the impression of doing important work while in reality doing nothing at all. An experience in treadmilling came his own way when, after a childhood of being an Army brat, he was formally inducted and stationed on Okinawa to write propaganda for broadcast to North Korea. Since neither he nor the other writers knew Korean, Korean newswriters were employed as translators although they were quite capable of turning out the stories in the first place.

First determining theoretically the direction and finished size needed to develop his ideas, Ray proceeds to write at great length, creating a mass that, like many sculptors, he proceeds to cut away until the finished form is revealed within. The entire process he considers quite rapid; he spends little unproductive time staring at blank pieces of paper.

A violinist and pianist, Ray also does classical composing, with performances having taken place of such works as *Three Gizmos for Piano*. A number of the usual odd-lot jobs, including fruitpicker, sustained him prior to his most recent job: using knowledge of bureaucratic procedures and mathematical niceties, he secured appointments with government officials for a sales staff and scheduled the salesmen's time. This job folded, along with the company's entire sales division, as a result of the current recession. Since the Columbus, Ohio, area is one of the hardest hit in the country, Ray figures unless some unexpected job offer comes his way, he will carry on as a full-time writer. ■

Jay Kay Klein's biolog

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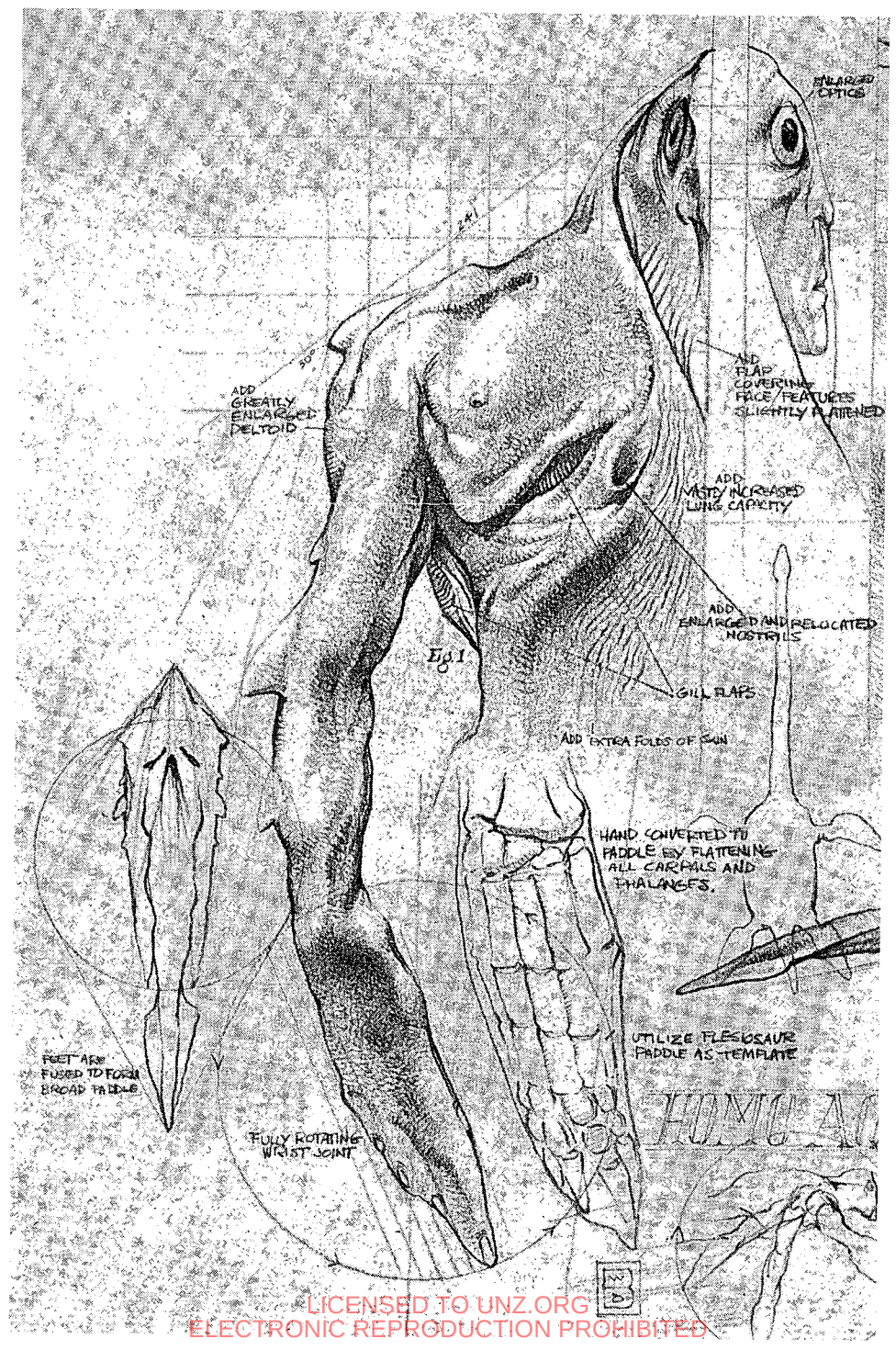
ENLARGED OPTICS
ADD FLAP COVERING FACE / FEATURES SLIGHTLY FLATTENED
ADD GREATLY ENLARGED DELTOID
ADD VASTLY INCREASED LUNG CAPACITY
ADD ENLARGED AND RELOCATED NOSTRILS
Fig 1
GILL FLAPS
ADD EXTRA FOLDS OF SKIN
HAND CONVERTED TO PADDLE BY FLATTENING ALL CARPALS AND PHALANGES.
UTILIZE PLESIOSAUR PADDLE AS TEMPLATE
FEET ARE FUSED TO FORM BROAD PADDLE
FULLY ROTATING WRIST JOINT

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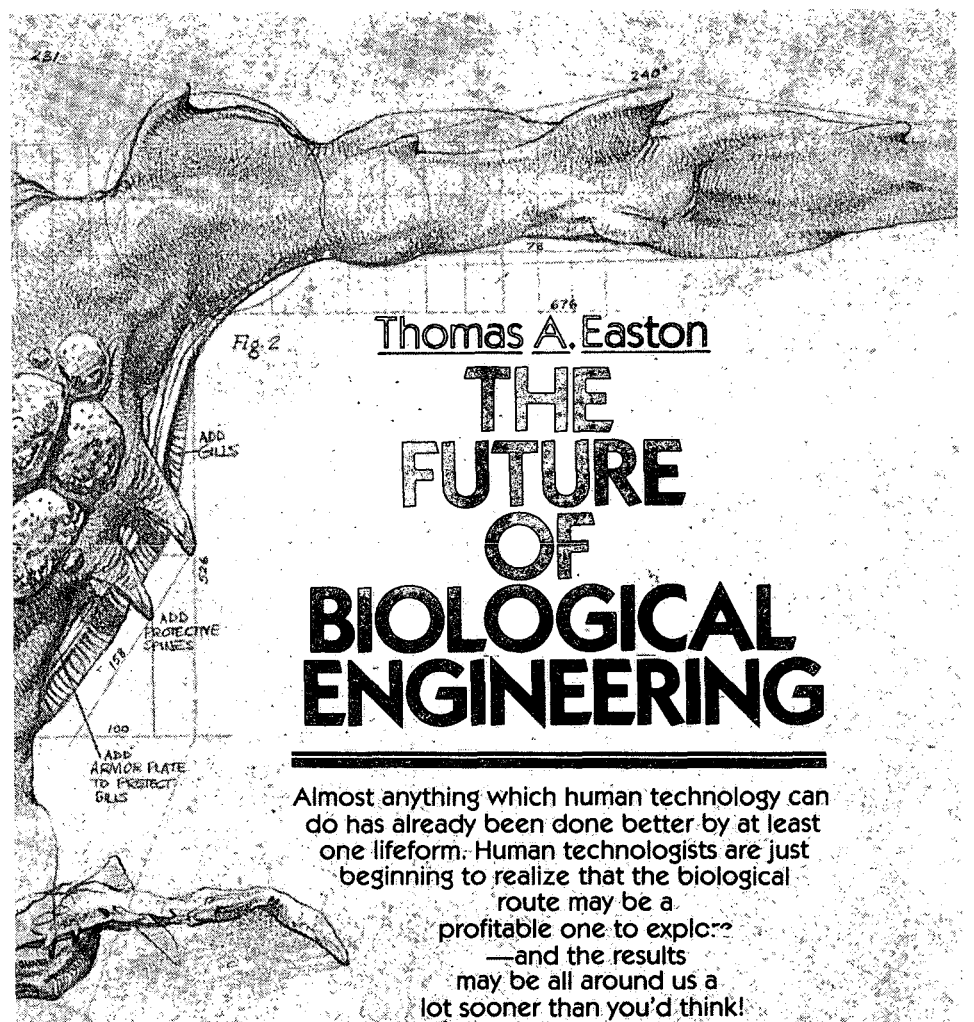

Thomas A. Easton

THE FUTURE OF BIOLOGICAL ENGINEERING

Almost anything which human technology can do has already been done better by at least one lifeform. Human technologists are just beginning to realize that the biological route may be a profitable one to explore —and the results may be all around us a lot sooner than you'd think!

A few years ago, I described for a car magazine a beast that might one day replace the automobile. That's right. A beast. An animal. It breathed. It ate hay, not gasoline or diesel oil. And it had a top speed of 60 mph.

But it was no super-horse. Oh, no. It had wheels, you see. It had brakes and antennae and a hard shiny skin. It was a cross between a cockroach and a lobster. I called it a Roachster.

It sounds like something right out of science fiction, doesn't it? But it's not really that far out. It is not only conceivable, but possible, and even likely. The techniques exist today to take a cockroach cell and a lobster cell and make them fuse together, forming a composite cell with all the hereditary information (genes)

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of both creatures. Already the cells of mice and rats, men and hamsters, plants and animals, have been so fused. The trick is to mix the cells with some agent that promotes cell fusion. One such agent is inactivated (noninfective) Sendai virus. It binds the two cells together and permits them to join, much as two soap bubbles brought close together will merge.

Composite beasts—manstersor plantimals—have not yet been produced in this way. They may never be. Once two cells have been fused, the genetic information in their two nuclei blends. In the process, the hybrid casts off some of the chromosomes of one parent cell, perhaps retaining only one or two chromosomes out of fifty or so (humans have forty-six). The resulting hybrid cell is dominated by the genes and gene-instructed characteristics of one of the parent cells. The other parent contributes relatively little genetic information.

A complete composite would thus require a way to make the hybrid cell retain and use more of its parents' genes. Yet cell fusion experiments have proven very useful to researchers interested in just which human chromosome bears a particular gene. They fuse human cells with hamster cells. Once the hybrid has cast off the "extra" human chromosomes and stabilized, it retains one or more human chromosomes. By picking a hybrid with a particular retained chromosome and then looking for gene products (proteins), the researchers can learn which genes are on that chromosome. In this way, they can develop a map of the human genome akin to those they have developed through cross-breeding experiments for short-generation animals such as the fruit fly and for plants such as corn.

The cell fusion work has already given rise to one industry. Less than ten years ago, researchers found that if a cell was taken from a mouse myeloma, a cancer of the blood-forming tissues in the bone marrow, and fused with an antibody-producing cell taken from the mouse's spleen, the hybrid cell could retain both the spleen cell's ability to produce a specific antibody and the cancer cell's ability to multiply indefinitely. They called the hybrid cells "hybridomas" and immediately began to use them to produce large quantities of specific antibodies. The antibodies are called monoclonal antibodies because they are of one type (mono) and are produced by the progeny of a single cell (a clone).

Antibodies are proteins that can combine with specific other substances, or antigens. Each antibody combines with only one antigen, and for each antigen there is at least one antibody. As part of the body's immune system, antibodies serve to tag and remove foreign materials. They can also be used to isolate single substances from mixtures in the laboratory, for purposes of identification or purification, so that sources of specific antibodies are quite valuable. Now, thanks to cell fusion, the sources exist. A hybridoma can be made to produce virtually any desired antibody.

The trick is to inject—to vaccinate—an animal with the antigen one wishes an antibody for. The animal contains a few cells able to produce antibody for every possible antigen except those native to

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the body. On exposure to a foreign antigen, the few cells that can produce matching antibody begin to multiply and produce the antibody in quantity. Many of these cells settle in the spleen. By removing the spleen, a researcher can obtain these cells, although they are mixed with cells that produce many other antibodies.

The researcher then takes myeloma cells from the same or a related animal and fuses them with the cells taken from the spleen. Some of the resulting hybrid cells produce the desired antibody. Once the researcher isolates them from the others, he can grow them in culture dishes. He then has his hybridoma and a source of pure, one-antigen antibody.

Several companies have followed this route. Their ads can be seen in such scientific journals as *Science*, where they offer monoclonal antibodies against various human, viral, and mouse proteins. The antibodies are now used mainly in research, but they hold great promise for medicine. They might someday serve to cleanse the blood of viruses, to attack drug-resistant bacteria, and even to fight cancer. Antibodies alone can kill cancer cells, and they can, when attached to chemotherapeutic drugs, be used to deliver these drugs precisely to the target cancer cells. Such a method of cancer treatment would be much better than the methods now used. Like radiation-based treatments, chemotherapeutic drugs pervade the entire body, killing not only cancer cells, but also normal, healthy cells. This is why their side-effects—nausea, hair loss, vomiting, and general debilitation—are so dreadfully inevitable.

Cell fusion is not, of course, all of biological engineering. The future will add many techniques, and even the present holds a few. Selective breeding is one that may be replaced as we learn how to tinker directly with the genes. The use of prosthetic devices to replace limbs and internal organs is another, and one that should become altogether marvelous. Miniature computers and servomechanisms are making possible artificial limbs that work almost as well as natural ones. New materials and tiny power sources are appearing in artificial hearts. Sensors and feedback mechanisms let drugs such as insulin be metered by an implanted artificial pancreas. These devices exist now in primitive, bulky form, and they are sure to become more and more sophisticated until a "bionic" man is a real possibility.

A present technique that may be of even greater future importance than cell fusion is recombinant DNA; already it is birthing an industry. It began with the discovery that certain "restriction" enzymes can cut DNA molecules (genes) in such a way that the cut ends are "sticky." That is, the broken ends produced when such an enzyme acts on one DNA molecule can join to the broken ends of another DNA molecule cut by the same enzyme; the two molecules are thus "recombined."

This technique was soon used to cut whole genes out of virus and bacterial chromosomes and to insert them into other viruses and bacteria, or into the small, nonchromosomal loops of bacterial DNA called plasmids. As they gained experience, the researchers learned how to take even a human gene

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and insert it into a bacterial cell in such a way that the cell would follow the gene's instructions and manufacture a human protein. They have done just this with the genes for the human hormones insulin, somatostatin, and growth hormone, for the human antivirus protein interferon, and for other proteins. Some of these proteins are of great medical importance, and this technique offers a way of producing them in greater quantity and lower cost than ever before. In the past they have been obtainable only from the organs of cadavers or by raising human cells in tissue culture. So little has been available that the need for insulin, for instance, has had to be met with the similar but not identical proteins of pigs and cattle. Now, however, bacteria can be programmed to make the human protein, grown in vast quantities in stainless steel vats and harvested cheaply.

The prospects are so enchanting that several companies—Genentech, Cetus, etc.—have appeared to develop and use recombinant DNA techniques to manufacture human hormones, interferon, and even vaccines. Though they have yet to put any product on the market, their stock is available on the New York Stock Exchange, and they are watched very closely by investors.

The techniques of cell fusion and recombinant DNA would both be useful in producing a Roachster. They would even be necessary, and they are already available. However, they would not be enough. They would have to be married to other techniques, some of which also exist now, at least in embryo.

To produce a Roachster, we would need either a way to force the hybrid cell to retain all or most parental chromosomes, or a way to select hybrids with particular desired genes. We can do the latter already, as in the production of hybridomas, but it is not really enough here. We would also need a way to grow a single hybrid cell into a full-scale animal, a way to force the creature to grow to a size comparable to an automobile, and a way to give it wheels. The wheels can be produced by mutation as modifications of the animal's shell. The growth can be induced with hormones. Growing the animal from a single cell is really a matter of cloning, differing only in the source of the cell (in true cloning, the nucleus of a cell from an adult animal or an embryo is transplanted into an egg cell; the egg then develops normally). And cloning may be within our reach already. It is done regularly with plants, and it has recently been demonstrated with mice and fish.

A Roachster may thus be possible. I won't say it is likely, for when the oil eventually runs out—as it must—we may well find other alternatives, such as genetically engineered fuel trees. Melvin Calvin, of the University of California at Berkeley, has reported a species of Brazilian tree that can be tapped like a maple tree, to give a sap so rich in hydrocarbons that it can be burned without processing in a diesel engine. With a little genetic tinkering, that tree might be induced to grow in cooler parts of the world, such as North America, and to produce fuel in greater quantity. Picture, if you will, our roads lined with oil trees instead of elms and

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oaks. Each one is equipped with a valve and a hose. When you run low on gas, you simply pull up to the nearest tree and fill up. Free.

Yet the Roachster scenario does illustrate the potential of biological engineering. The possibilities range far beyond anything we now think of in connection with living things. They include vehicles for land and sea. They include living clothing, perhaps a modified ivy rooted in your blood, or in a pot of dirt you carry like a handbag. They include housing—how about a giant pumpkin or gourd, roses around the door, a certified pure and natural cottage for thee and me? Or a modified sequoia, hollowed and tunnelled as a biological skyscraper? Today, the ideas belong to science fiction. Tomorrow, they just might be reality.

The Roachster also illustrates something else. Cloning has been a bogeyman ever since its first conception. The Cassandras among us have warned of hordes of identical soldiers, or genetically placid citizens, or perpetuated dictators. They ignore the problems. Clones will not be mentally identical—they cannot share the experiences that shaped the original—although they may share such general features as high intelligence or aggressiveness. Furthermore, armies of clones are hardly economical. They would require masses of highly paid technicians and piles of expensive equipment, and the variegated hordes we know and love already all were produced by unskilled, unpaid volunteers. If cloning is ever perfected, it is far more likely to be used to grow single, engineered cells into an initial stock of novel creatures that can then reproduce by more conventional means. That is, it will be a tool for making prototypes and uniques. Roachsters would be produced by a Detroit turned ranch (and those on the market would surely be sterilized to cut out the free-lancers).

What might the prototypes be of? Roachsters, ivy cloaks, and pumpkin shells are probably far off. Nearer in the future are more prosaic creatures. They will probably include new food animals—hybrids with less bone and fat and more meat, hybrids that grow hyperefficiently on grass or garbage, even plantimals whose skins bear chlorophyll and that can fatten on sunlight and water alone. There will be new crop plants —how about a cross between sunflowers and sesame plants? Or a potato that tastes like passion fruit? Or a corn with the protein content of soy beans? Or a grain that can fix nitrogen like a legume? Researchers are already seeking ways to implant the genes for nitrogen fixation into plants that cannot now manage the trick; they want to reduce the need for artificial fertilizers, now running at some fifty million tons per year in the U.S. alone. They are also hoping to transplant the more efficient style of photosynthesis used by corn and sugar cane into other plants to boost food productivity.

But food is not the only resource whose supply we need to improve. There is oil—and Melvin Calvin's oil trees, as well as other plants with hydrocarbon-rich sap, from milkweed and dandelion to jojoba and guayule. There are minerals—and it is already known that some plants can concentrate metals

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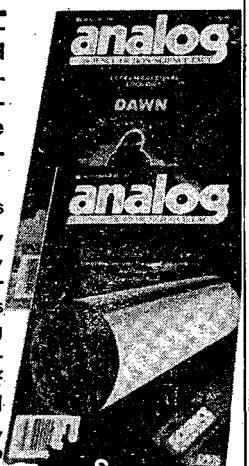

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such as selenium from the soil. Some such plants are even used by prospectors; burning the plant and assaying the ashes is much easier than digging a hole and cracking rocks for an ore sample. It may be possible to tinker with plant genes until mines for gold, silver, uranium, iron, chromium, and many other valuable metals can be replaced by farms. The plants might even be seaweeds, for the oceans contain a virtually inexhaustible supply of every metal used by our civilization.

The eventual products of biological engineering may also include adaptations of animals, including humans, to novel environments. It might be useful, for instance, to give undersea workers gills, webbed hands and feet, and fins. It might be necessary to give workers on the moon or in orbit such features as the ability to store oxygen in case of spacesuit leaks, or an immunity to the loss of bone calcium that accompanies life in free fall. It might be desirable to give people who work around radioactive materials thick, radiation-resistant hides, perhaps containing lead plates or scales.

All this is as conceivable—and as possible—as a Roachster. So are soldiers with built-in weapons and defenses, with dagger-like fingers and immunity to poison gas. So are men whose eyes are microscopes or telescopes or infra-red sensors. So are ordinary citizens with improved immune systems able to fight off every known disease, including cancer. So, then, are people whose susceptibility to all human ills has been engineered away. The future may belong to the immortals.

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But little of all this can be for us. The biological gadgetry—the wings and gills and built-in microscopes—has too many years of development ahead, even in the form of prosthetics. The immortality, by its nature, must come from changes in the genes, from changes in the sperm and egg from which we grow. It is thus for our children, or theirs.

The most we can hope for is to enjoy the benefits of biologically engineered supplies of food, fuel, and minerals, perhaps to ride in a Roachster or live in a pumpkin shell, almost certainly to live a little longer, thanks to new treatments for our ills. We can only dream of a future when all the factories have been replaced by farms and ranches, when pollution exists only in history books. (Dung? That is a fertilizer. Your Roachster would help keep your house green, and your house might help feed the Roachster. It's called ecology.)

Even these benefits, however, are likely to be farther off than we might like. Let Roachsters and pumpkin shells and the like be engineered. How long will it take to go from prototype to production to low-cost ubiquity? Years, certainly.

Would you like to see something sooner? Then think of how a new technology is always seized upon by artists to develop new art forms. They have done it with the camera, the laser, the photocopier, even electronics. What then might they do with the technology of biological engineering? Picture an animal, motionless on a pedestal, a figure of leather and chitin, of aesthetic bumps and spires, that sings when stroked. A man or woman of accentuated beauty. A fish whose vividly colored sides mimic a Mondrian. A lyre bird whose tail can actually be played. Call it biosculpture, and realize that the suggestions here are but pale intimations of the eventual reality. The forms it will give us will be far beyond our present imagination, for that is one function of art.

Would you like another promise? Artists are not the only ones who seize new technology. The toymakers do it too, and I invite you to conjure up your own visions—or nightmares—of future dolls and games and pets. ■

● The history of mankind divides into two great periods; one existed from time immemorial...and was characterized by the ritualist view of nature. The second began with...the modern machine age....In both periods men wanted to control life and death, but in the first they had to rely on non-machine technology...by building a ritual altar and making that the locus of the transfer and renewal of life-power.

Ernest Becker, *Escape From Fire*

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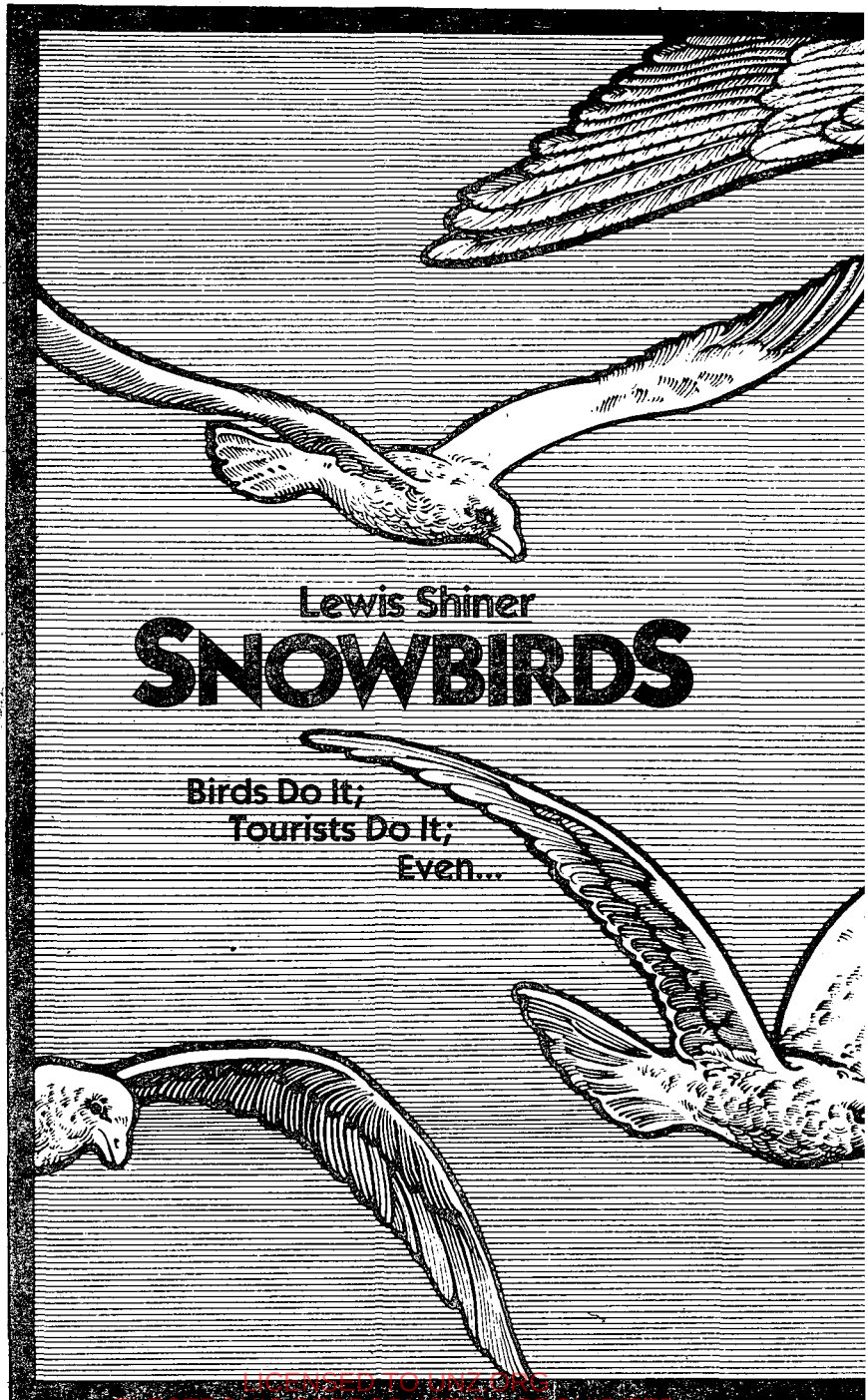

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She was still trying to make sense of what she'd learned when she looked up and found herself caught in a massive traffic jam.

One minute she'd been moving down Central Expressway at nearly forty miles an hour and the next she was stopped, closed in by cars on all sides. I should have known better than to take Central, she thought, no matter how late it is. The ordinariness of it took her mind off her other problem for a moment, and for the first time she really noticed what was going on around her.

It was cold, of course, bitterly cold, but the sky was clear blue in the last light of the sun. A voice on the radio was going on about the weather crisis, comparing the temperatures from April a year ago and reciting an endless stream of statistics. He had no answers, and Marge turned him off.

Apparently something more interesting was happening outside. A little girl in a red party dress was hanging halfway out of a car window, pointing at the sky and shouting something at her mother. Just ahead another car door opened and a man in jeans and a western hat got out to stare at the sky as well.

What the hell is going on? Marge wondered, shifting into neutral and setting her brake. She rolled her window down, wincing as the icy wind hit her eyes, and craned her neck upward.

She saw an old-fashioned biplane moving in broad loops and swirls, directly overhead. Skywriting, she realized. She hadn't thought they did that anymore.

BEWARE, it said.

The word gave her a chill. I don't like this, she thought. I don't like this weather and I don't like being stuck here.

The plane finished a second word: INVADERS.

People up and down the stalled expressway were getting out of their cars and standing in the roadway, collars turned against the wind, watching the sky.

The plane started a new line with FROM, then followed it with THE.

Marge could smell the exhaust coming up through the floor. She turned her engine off and drummed her fingers on the dashboard.

People were rubbing their arms now, nodding to each other, and getting back into their cars. Marge looked up to see the plane flying off, leaving the completed message behind it.

BEWARE INVADERS FROM THE FUTURE

Probably, she thought, a publicity stunt for some stupid science fiction movie. But the explanation didn't convince her, and she wanted very badly to be home, nestled in the couch with a drink in her hand.

It was another fifteen minutes before traffic was moving again. Two of the three lanes were stalled, and as Marge finally began to inch forward she could see the reason. Nearly a dozen cars were sitting motionless in their lanes as the rest of the traffic wound slowly around them.

Accidents? she wondered. Out of gas? Then she realized that several of the cars were still running, with thin plumes of smoke trickling from their exhausts. There were no piles of broken glass, no raised hoods; no dented bumpers.

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The cars were simply deserted.

On his fourth try he got hold of her. He'd been calling every fifteen minutes since six o'clock, telling himself he wasn't worried, but still vastly relieved when she answered the phone.

"Have you been calling?" Marge asked.

"A couple times."

"There was a humongous traffic jam on Central. Listen, you want to have dinner or something?"

"I thought that might be nice."

"Why don't you just come over? We can do something here."

"Fine," Louis said. She sounded distracted, but at least she wanted to see him. "I'll be right over."

Before he left the apartment he turned off the gas space heater and stood in front of it for a second or so, soaking up the last of its heat with his outstretched hands. About the time of his second call to Marge's apartment he'd felt something hit him, a feeling of uneasiness so strong that it had almost nauseated him. Even now that he knew she was all right the feeling was still there, a knot of tension in his stomach.

He put on his overcoat and went down to his car.

Marge answered the door in a terry-cloth robe, her hair wrapped in a towel. "Why don't you get us some drinks?" she said. "Jesus, what a day."

Louis went to the kitchen for the whiskey while she disappeared into the bedroom. By the time he had the drinks made she had put on some jeans and a sweater and had sprawled back in her reclining chair. She wanted to be left alone, Louis knew, or she would have been sitting on the couch. He set her drink next to her hand and took a chair across from her.

"So tell me about it," he said.

"I don't know if I want to. It sounds crazy."

"Try me."

"Well . . . you know the bank has been having me run credit checks. Mostly on snowbirds like you."

"Snowbirds?"

"You know. Northerners. The ones who keep moving down here because of the supposedly better weather." She stopped to take a long drink. "God, I needed that. So anyway. This morning I had a whole batch of them to process, and suddenly I notice, hey, there's only about four or five different banks listed as credit references for these guys."

Louis's stomach clenched hard enough to bring a taste of bile to his throat. He set his drink down on the coffee table.

"So far all I've been doing is just pulling in a bunch of reports off the DataNet. I mean, there's not really a problem or anything, all the credit ratings are fine, but this business with the banks is bothering me. So I call one of the banks, one that just got on the Net in last three years or so, where I know they've still got some old handwritten records down in the basement."

"And?"

"And there weren't any written files to back up the stuff on the Net. Not for any of the people I was calling about."

"Maybe they got rid of the old files?"

"Uh-uh. No way. So I went to the boss with this and he just told me to drop it. He said if the Net said their

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credit was good, that was all he cared about."

"That sounds reasonable to me."

"Is it? What if somebody is ripping off the Net? Shouldn't I like try to do something about it?"

"Hey," Louis said. "Relax. If you keep pushing this, all you're going to do is force them to fire you. You know how they are."

"Yeah, maybe," she conceded. "You want to eat?"

"I . . ." A fist of nausea hit him. He blinked, and for a fraction of a second the apartment was gone. He had a fleeting impression of desolation, of rolling yellow-gray clouds and a smell like burning gasoline. Then he was back on Marge's couch, gasping for breath.

"Louis? Are you all right?" Marge was out of her chair, coming over to him. "You look like you're about to faint."

"I'm okay," he said thickly. "Fine. Must have had something bad for lunch."

"You want to throw up?"

"No. Don't . . . think I could. I feel okay now." The couch was solid under his hand again, and he ran inventory on his body—no pains, no tingling in the extremities. Not a heart attack, then, or a stroke.

Then what was it? his mind was screaming. What the hell just happened to me?

He lay awake that night long after Marge had curled into sleep. The . . . episode, whatever it was, hadn't repeated itself, and he'd finally been able to choke down some dinner. But it had left a precarious, off-balance sort of feeling behind, and now he was afraid to go to sleep.

They hadn't made love. Marge cared for him, he knew, but there didn't seem to be much of a physical aspect to that caring. I must seem old to her, he thought, though he knew forty-nine was barely even middle age. He was a little out of shape, picking up a bit of a paunch, going gray at the sides and thin on top. But then, at twenty-eight Marge was a bit hard-looking from her years of dieting, her voice and her temper both a little brittle.

Nothing that special about either one of us, he told himself, each of us hanging on because there's nothing else to do.

It was just the weather that had him down, he told himself, the weather and the heartburn or whatever it had been. He moved closer to Marge's warmth and eventually fell asleep.

Marge coasted through the morning from habit, her mind blurred by lack of sleep. Something dark and formless had been lurking in all her dreams, and she had kept waking up frightened and out of breath, unable to get back to sleep for as long as an hour at a time.

Outside the office it was gray and bitterly cold, with more snow threatened by afternoon. April blizzards bring May . . . what? she wondered.

She was about to break for lunch when the phone rang, jarring her nerves so badly that she banged her knee against the underside of the desk. She snatched it up, took a breath, and said, "Hello?"

"Marge? This is Cathy, at First Bank in Albany. I talked to you yesterday?

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Well, listen. I did some calling around here, on my own, and you know those files we couldn't find? Well, I decided to try and run down some of the addresses that were listed on the DataNet, to see if maybe we'd screwed up somewhere."

"Yes?" Marge said, rubbing her knee absently.

"Well, we didn't. None of the real estate agents listed have ever heard of those people. They aren't in any of the old phone books. It's like they never existed at all."

"That's weird," Marge said.

"Isn't it? I think it's kind of exciting. I bet it's the Mafia or something, you know? What do you think?"

"I don't know what to think." She stopped rubbing her knee and leaned back in her chair. "I wish I did."

"I'm going to keep looking around," Cathy said. "If I find anything else I'll let you know."

"Okay," Marge said. "But listen . . . be careful, will you?"

"Sure," she said. "Gotta go. 'Bye."

Marge put the phone down. So, she thought. Somebody is tampering with the Net. It had happened before, of course—they caught one or two people at it every year, usually siphoning money off into a numbered account somewhere. But this was different. Who was doing it? Who were these people with no pasts? Where were they coming from?

. . . from the future, her mind answered her.

Beware.

She shook her head. Whoa, she thought. Don't start going off the deep end.

But what if the skywriting hadn't been a publicity stunt? What if somebody else had gotten onto the same thing she had? She started to get up and go to lunch, and then sat down again. A couple of phone calls. It couldn't hurt to try that much.

She picked an aircraft charter company out of the Yellow Pages and they gave her the names of two companies that did skywriting in the Dallas area. She called the first one and got a tired female voice on the line.

"Yes," the woman said, "we did it. No, I can't tell you what it means. We just did a job, you know? We don't ask any questions about what we write, long as it's not dirty or political."

Marge panicked and dropped her flimsy cover story. "Look, this is really important. I have to talk to whoever paid you to do that message. It's important. It's . . . life or death."

The tone of the woman's voice changed. "Then maybe you better talk to the police, hon."

"What?"

"If it's life and death, you're too late. The guy that paid for that ad was killed last night, and the cops have been hanging around here all day. Maybe you better give me your name?"

Marge put the phone back in the cradle.

Suppose, she thought, just suppose, that it all ties together. Suppose . . . suppose *everything* ties together. . . .

The thought terrified her, but she reached for her video terminal anyway, and, with trembling fingers, typed in the name of the program that accessed the DataNet.

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ENTER SOCIAL SECURITY NUMBER

She had seen Louis's number one day and memorized it, cursing herself as a nasty, prying bitch all the while.

Let me be wrong, she thought, as she typed the number in and pressed the NEWLINE key.

Louis's name appeared on the screen, and the program asked her if it was correct. She hit the plus bar and the screen winked out, then displayed fifteen lines of information.

It was all there. First Bank of Albany, the lists of realtors, employers, and credit cards.

He was one of them.

Louis's phone rang at 4:17.

"Hello?"

"Louis?"

"That's right."

The voice began to recite a short poem of nonsense syllables. Louis wanted to hang up, but he felt oddly compelled to listen. Then the voice stopped and the world melted away.

It was like the night before, but stronger, violently nauseating. He dropped to his knees, still clutching the phone.

"Are you still there, Louis?"

"Yes," he gasped.

"Do you know who you are, now?"

"Yes, I . . ."

"Then you know what you have to do." There was a silence, then the buzz of a dial tone.

When she got home, Louis was waiting for her. He sat in an armchair, holding a .22 target pistol. The barrel was lined up with her stomach, and Marge felt a sick, scared bravado come over her.

"So it's real," she said.

"Yes. I didn't know myself until this afternoon. Then somebody called and said some kind of code that brought my memories back."

"And told you to kill me, because now I know too much."

"I'm supposed to do that, yes."

He was pale and sweating, and there was a sheen of terror in his eyes, but otherwise he hadn't changed. He was the same, ordinary man she'd slept with, and felt sorry for, and wished she could fall in love with, but hadn't been able to.

"Are you going to? Kill me?" It surprised her that she could say it so easily.

"No," he said. He looked down at the gun, as if he didn't know where it had come from. "I don't think it matters much anymore. It's not worth it." He tossed the gun onto the sofa.

"You shouldn't throw guns around," Marge said, wanting to scream with relief. "It's dangerous."

"Dangerous," he said. "We're being sucked back, you know. One at a time. The strain is too much."

"What strain? Back where? Am I supposed to have this all figured out or something?" She sat down heavily on the couch. "I don't know what's going on." The gun was next to her but she didn't pick it up, instead letting her head drop slowly to rest on her knees.

"We come from . . . about a hundred years from now. A lot of us, I guess something around a hundred thousand of us. We picked this time because it was the earliest when the Net was in operation, so we wouldn't have to waste

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a lot of time building cover stories. And there's still another lifetime or so before things get bad."

"Bad?"

"Where I . . . we . . . come from, there's no energy left. No heat, no cars. The winters kept getting worse and then the climate just . . . shifted. A hundred years from now most of North America is under about six to a hundred feet of snow, and the glaciers are moving south.

"You think you can imagine it? Try to imagine not being able to bathe because there's no clean water, and if there was water you wouldn't be able to heat it, and even if you could there wouldn't be anyplace warm enough to use it."

"Am I supposed to feel sorry for you now?"

"No. It doesn't make any difference. I've held on this long, but I haven't got much time left. Maybe an hour or two."

"And then?"

"It's hard to explain. It's like inertia, sort of—if you don't change anything, it's not too hard to stay here. But the more improbable your being here becomes, the more likely you'll just snap back."

"And when people find out what you really are—or even suspect—that makes it worse, right?"

He nodded.

Marge remembered the deserted cars on Central Expressway. The message in the sky had done that to them, driven them back.

"And the weather," she asked. "Is that your fault, too?"

"Yes. It's kind of ironic. The disturbance we made coming back here loused up your own climate. You know people used to blame the migrating birds for bringing cold weather with them when they flew south? What was it you called us? Snowbirds?"

He stood up. "I'm going now. I can't fight it off much longer. I don't want to be here when it happens."

"Louis . . ." She got to her feet, reaching for his sleeve.

He stopped. "You're not even going to remember me, you know. It may take *you* a day or so, but people who don't really know me, they'll forget right away."

She felt bitter, used, betrayed. "Go on," she said. "Get out of here."

The door closed quietly after him and she heard the sound of his car leaving the driveway.

"I won't forget;" she said to the wall.

He pulled into the street, pains dancing up and down his ribcage. Goddamn it! he wanted to shout. Goddamn it to hell!

The road in front of him and the houses to either side were flickering, like badly framed film in a projector. The car was running smoothly enough but his stomach felt as if he were on a Tilt-A-Whirl.

On a lawn ahead he saw a set of abandoned metal furniture, left out through the long winter and the endless, freezing spring.

Lawn furniture, he thought. Sweet Jesus!

He didn't want to go back. Damn that man and his skywriting, damn Marge and her nosiness, damn them all to a cold and airless hell.

He wrenched the wheel and the car

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shot over the curb, cutting muddy tracks through the damp yellow grass, crashing into the metal table and chairs. Something tore loose under the car as he drove over them but he just pushed harder on the accelerator. He ran down a mailbox and clipped a white picket fence, then wrestled the car back onto the street, his anger spent.

The car coasted to a stop and he leaned back, not resisting anymore, letting himself fall into the yawning darkness.

Wanting lights and crowds and loud colors, Marge drove through the light snow to Northpark. She wandered around the mall and finally stopped to rest at the fountain outside Neiman's, watching three seven-year-old boys sliding on the tile sculpture.

"Hey," she shouted to them. "Come here a minute."

They stopped and stared at her.

"It's okay," she told them. "I just want to show you something."

One of them, a little older-looking than the other two, sauntered over.

"You want to see something neat?" she asked him. "See that man over there?" She pointed to a middle-aged man who reminded her of Louis (Louis what? What was his last name?), well-dressed, bundled in an overcoat and scarf. "Go up to him and ask him something for me. Okay?"

"Ask him what?"

"Ask him, 'Are you from the future?' Then see what happens."

"You're crazy."

"You think so? Try it."

The boy laughed and ran away. She watched him telling his friends what she'd said, saw them arguing back and forth. Then, after a minute or so, the smallest of them went timidly up to the man in the overcoat.

Marge found herself holding her breath.

The boy tugged at the man's trouser leg, and the man bent over to listen. The boy pointed back to Marge and asked him something, and for a moment the man's eyes seemed to glow with a fierce hostility.

Marge blinked.

Hadn't that little boy just been talking to an older man? She shook her head.

I've been working too hard, she thought. I need to forget all this nonsense I've been worrying about (what nonsense?) and get some rest.

As she got up, three little boys, laughing wildly, ran past her, asking a question of everyone they ran into.

Marge pushed open the heavy glass door of the mall and stepped into a warm April mist. ■

● What we need is not less science and technology, but more, of the right kinds to replace the bad old ways. A problem—which we must take into account before we can hope to accomplish anything real—is that those old ways did not spring into existence, nor do they persist, for no reason at all.

Poul Anderson

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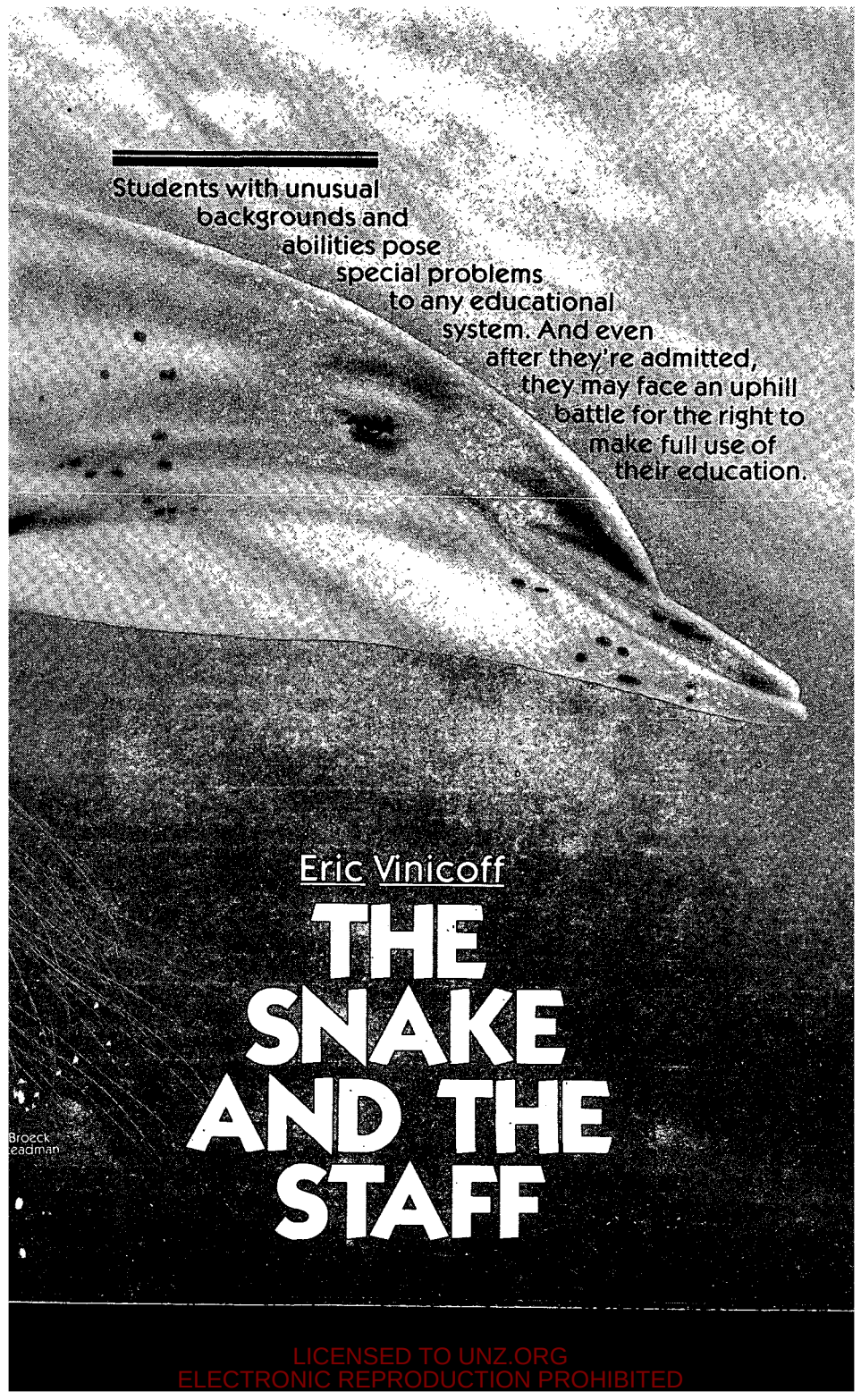
Students with unusual backgrounds and abilities pose special problems to any educational system. And even after they're admitted, they may face an uphill battle for the right to make full use of their education.
Eric Vinicoff
THE SNAKE AND THE STAFF
Broeck
eadman

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"The reticuloendothelial system is—"

Four words into the lecture Sharon tuned out. Not visibly—she still hunched forward in her seat, eyes focused on the grisly images in the big holotank at the front of the hall. But mentally she was gone, and why the hell not? Lectures were a boring anachronism, part of the "great tradition" that fought every attempt at modernization.

—You really should pay attention.

—I don't recall soliciting your opinion, she thought back sharply.

—Aside from academic and professional considerations, don't you find the innermost workings of your body somewhat fascinating?

—It's a defense mechanism. If you can't be fascinated, you can't be nauseated either.

The speaker voice droned on. She briefly wondered where the protoplasmic Doctor Haithcock was today. At his tennis club? Or maybe double-dipping with a lucrative bit of surgery on school time?

—If you must indulge in cynical reverie instead of learning, at least keep your eyes on the tank. One of us should profit from our presence.

—Relax, I know my job. And quit fussing about my study habits. I've got a pirate of this lecture at home. I'll digest it over the weekend.

Her thoughts left the student-jammed hall, flipping forward and backward through the pages of her immediate concerns. Keeping up with her studies. Dinner with Jim, and the ramifications thereof. The ongoing debate over where to take her internship. And lastly, unavoidably, the meeting scheduled for 3:30 P.M. in the dean's office.

—Quit worrying about that. It's purely my problem.

—No way I can stay emotionally detached with you swimming around in my head. In fact, I'm not even trying. I'm on your side all the way.

She scratched her head where the implant had gone in—three years, and it still itched in hot sticky weather. The transceiver case was, as always, a hard lump strapped below her right armpit, hidden by her loose blouse. The arrangement that had seemed obscene at first was now only a minor irritant.

Finally Dr. Haithcock ran out of steam. The tank went clear, and the overhead glow panels brightened. One hundred and ten future torchbearers of American medicine rose, chattered, packed up their notecomps, and headed for the exits. She flowed out with the herd.

Spring in La Jolla was like high summer in most parts of the country. Slipping on her dark shades and wide floppy hat, she followed the brick concourse toward the parking lot.

The University of California's San Diego campus had been designed by one or more architects with a taste for the hugely bizarre. She walked under the shadow of the undergraduate library, looking like a cinderblock pile turned upside down. Dorm towers resembling highrise luxury hotels dominated most of the horizon. Rich green lawn and carefully nurtured shade trees hid the fact that the great university squatted on semi-arid scrubland.

She got into her car and drove across campus. Sun and breeze came through the open sunroof. *Next stop, the dean's*

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lair, she thought with as much casualness as she could fake.

—Try to unwind. The currents flow where they will.

—Determinism sounds damned strange from someone who's trying to overthrow the whole medical establishment.

—I prefer to think of it as a natural evolution.

—You're going to hear it called a few shorter and more pungent things than that before you're through.

She was a frequent visitor to the dean's sanctum on Kieko's business, but she always felt the same schoolgirl clutch of nerves, as though she had been summoned.

She didn't have to sit and stew in the outer office; the secretary ordered her in immediately.

Curtains covered the windows, and the office seemed very dark despite the ceiling glow panels. The carved hardwood walls seemed to soak up the light. Dean Coyne sat behind his desk, a short, slim old man who had practiced medicine in the Marine Corps much of his life and whose body remembered its discipline. The other members of the Triumvirate of Terror were in their habitual seats: Doctor Atwood, the prunish old maid from the AMA, and Mr. Desicca, the somewhat younger United Nations official who had a too-obvious interest in female anatomy.

"Welcome, Sharon, Kieko," Dean Coyne said in his chain-smoking rasp —his habit had been well advanced by the time of the Surgeon General's report. "Please have a seat."

She did so, and smiled politely for Kieko's sake through the round of empty amenities.

"You know, of course," Doctor Atwood shrilled, "why we've asked you here today."

Sharon stepped aside and let Kieko carry the ball. Being a spectator in your own mind was a weird experience, but one she was pretty much used to by now. She sat back in the cheering section and rooted for him.

"I think so," he answered through her mouth—the tones were hers, but not the inflections. "The request I submitted to Mr. Desicca?"

"Exactly. It's such an extraordinary proposal that I decided to discuss it with you directly—so to speak—before taking it up with the Board of Governors."

"Thanks," Kieko said. "Frankly, though, I don't see anything extraordinary about it. I'm a pack healer, descendant of pack healers, and very close to graduation from this distinguished medical school. Why shouldn't I want to be a doctor?"

—Sweet reason isn't going to work with this old bag, Sharon subvocalized. *Get tough with her.*

—No back-lobe driving, please.

Doctor Atwood's mouth twitched soundlessly as she looked for the right approach. Kieko was far from just another med student. Say the wrong thing to him, and create an interspecies incident. Which explained Mr. Desicca's alum-sucking expression as he stood by with his diplomatic fire extinguisher.

"But that's essentially what you're training to become," the AMA official finally said in a soothing voice. "Dean Coyne tells me your grades are excellent. You undoubtedly have an outstanding medical career ahead of you.

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I don't understand what's troubling you."

Doctor Atwood was making the common mistake of talking down to Kieko. He wasn't simple, just uncomplicated. "I explained that in my request," he said, with what Sharon felt as mild puzzlement. "I want to be a fully licensed, practicing physician. Not just a diagnostician."

"Just a diagnostician? I would hardly put it that way. You and your kin, with your echo-ranging sonar sense, are the finest diagnosticians in the annals of medicine. You perform an invaluable service."

"But a limited one. *(A thinking X-ray machine,* Sharon echoed.) I've talked this over with the other pack-students here. We want to be healers of humans too."

Worry and revulsion were chipping at the edges of the old woman's control. "This entire conversation is pointless. Your, er, physical limitations make most medical careers impossible. You know that."

"You're talking about human medicine. There is another way."

This was the crux, and everyone in the room realized it. The tense silence widened until Dean Coyne finally filled it. "You're referring to what you call *healing*?"

"Yes. I know the word has bad connotations because of past users, but it's technically correct."

Doctor Atwood rallied. "The efficacy of your 'healing' is being studied at several prominent institutes. It's much too early to know if your folk medicine will be useful—and safe—for humans."

(—The studies have been going on for years, and will drag on forever if the AMA has its way. Or at least until it has manufactured enough negative evidence to permanently cloud the issue.)

"I'm a pack healer, and almost a trained doctor. I know that what I can do will work for walkers as well as swimmers, and safely. More safely than drugs and scalpels."

"You can't rush things, Kieko. You knew the parameters when you applied to attend medical school. There are intangibles such as public confidence to consider—"

"The AMA Board of Governors has to make the final decision, and you have some influence with them. I want to demonstrate healing to you. Then you can convince them I'm ready."

"I'm familiar with what you healers do," she sniffed.

"But you don't believe it. You need to actually see it done."

(—She doesn't dare believe. Neither do her AMA cronies. You're challenging poured-in-concrete beliefs. Not to mention their livelihoods.)

"It might be worthwhile to set up some sort of demonstration," Mr. Desicca said tentatively. Sharon took a bit of malicious pleasure in his difficult situation. How to reconcile two irreconcilable positions?

Both of the officials turned to Dean Coyne. He had become the *de facto* tiebreaker, a role he accepted with no visible reaction. He spoke decisively, as he always did. "Some faculty members have been pestering me to arrange just such a demonstration from one of our healer students. This would seem to be a good time. Doctor Atwood, you can

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observe unofficially, without committing yourself or the AMA to anything."

She nodded reluctantly.

"Kieko, would you like to show us how you heal, say tomorrow afternoon?"

"Very much. Thank you."

After the meeting, with the sun still high and hot at the beginning of evening, Sharon drove toward the ocean. She had study tapes waiting in her apartment, plus a plethora of household chores, plus her date with Jim to get ready for. But the futility of Kieko's small victory depressed her. She needed solace.

Entering the Scripps Institute compound, she parked in front of a low broad building fronting on the beach. It sent two piers well beyond the surf. The brass entrance plaque read SEA PEN SIX. The two UN Ranger guards waved her through—all the Guides were familiar faces here.

She went to her locker in the changing room and put on her swimsuit.

On her way to the exit she stopped briefly in front of a mirror. She couldn't help it—the change was nothing less than dramatic. She had always been an eyesore appearance-wise (assured so by her mother and gorgeous older sister); lumpish, dough-skinned, dressed and groomed in rebellion against the concept of beauty. But somehow, somewhere during her med school years she had blossomed. Almond-tanned skin curved pleasingly under the bright purple string bikini (something she would never have dared wear before). Her hair, as she tucked it under her swim cap, was cut in the current California Girl style. Her face was boldly etched, strikingly attractive instead of grotesque the way it had been.

She definitely liked what she saw. And so, to judge from her extracurricular life, did men.

—Sometimes I think you've been doing gradual reconstructive work on me the past three years.

Kieko sang his wordless song of laughter. *—Very few physical changes have been made, and none of them by me.*

—Physical?

—I may have helped open your eyes and mind. Nothing more.

—You better open your own. I can see and think you under the table any time. You're the one suffering from delusions. You think you can beat the system.

She went out the door and ran lightly on the planks to the end of the pier, delighting in the feel of sun and breeze. She shouted hello to the attendant in the shack, then dove into the calm water of the sea pen.

The chill shock turned quickly into the sensuous pleasure of the weightless world. She swam up to the surface and back-stroked toward the line of red buoys that held up the underwater fence. None of the other Guides was around.

—Kieko?

—Here. A large gray shape burst from the water beside her like a Trident missile, arched over her and disappeared with a teaspoon of splash.

—Very funny. Come back here and play like a gentleman.

—You can't accuse me of being a gentleman.

Kieko came up under her, a hard and

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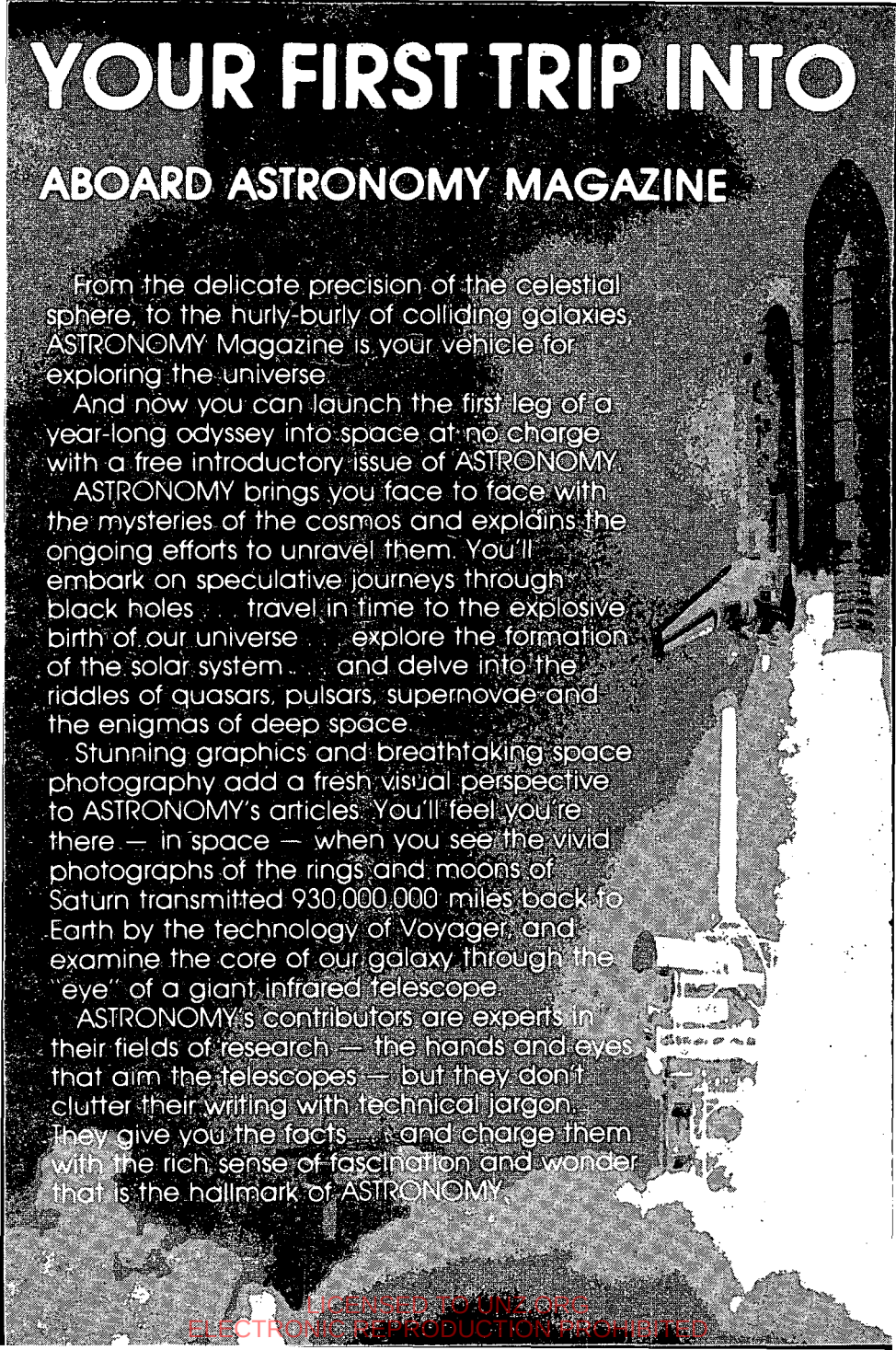

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slippery contour. She rolled over and grabbed his dorsal fin. When she was securely "saddled up," he took off.

Jumping and splashing. Skimming the wavelets. Turning hard. Diving to the roiled bottom murk where she couldn't see a thing. She enjoyed the ride doubly—her own pleasure and his echoed. Bleak predictions of the near future were forgotten, as were all responsibilities.

Eventually she rolled off. They swam together, weaving an impromptu water ballet from their mental communion.

Kieko looked like an overgrown Pacific Bottlenose dolphin, but the inward differences were as significant as those between man and ape. He and his kin were the pinnacle of cetacean evolution, smart enough to avoid research nets and tuna seines until they finally decided to reveal themselves to mankind.

—You're crazy to want to give this up, she thought. *Why bust your gut to become a doctor when you already have the perfect life?*

—Perfection has a way of becoming monotonous. I need to do more than play and heal my pack-kin.

—Like being a veterinarian for humans?

—It's a beginning.

—Beginning of what?

—I don't know yet. But I know this beginning is important, for myself and both our kin.

The restaurant was dark and cool, a pleasant contrast to the evening heat outside. She ate and frowned, her mind on tomorrow's demonstration, only vaguely aware of Jim's conversation and rising irritation. The young attorney looked tanned and athletic even in the flickering candlelight. He sat straight, tall and scowling.

". . . so we have to draft the contract by Tuesday. Almost a metric ton of point-nine-nine platinum FOB the *Spacing Dutchman* orbital city. Space law is becoming a big-buck field for the firm." He paused. "Earth calling Sharon. Come in, Sharon."

"Don't make fun of me. I'm in no mood."

"You're in no mood, that's for sure. I manage to leave my worries at the office—why can't you?"

The jab had a double meaning, both of which she caught immediately: her present distraction, and the link to Kieko that was always there. Kieko was asleep at the moment, but Jim didn't know that. In fact, he never knew when Kieko might be eavesdropping on their intimate moments.

"I'm sorry, Jim. Maybe I should have cancelled. This thing with Kieko has me tied in a knot."

"Your anxiety won't help him. Decompress. That's an expensive meal you're not enjoying."

"So bill me. Kieko hasn't much chance of convincing Atwood and the AMA, has he?"

"Exactly zero." A trace of pleasure sharpened his words. "Economic survival. If these porpoises can do everything you say, they can also put much of the medical profession on unemployment. Including you, you might remember."

"If healers can help people better than human doctors, so be it!"

"Spoken like a true romantic idealist.

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But you won't find many AMA officials similarly afflicted."

Silence closed in again, and went with them on the drive to her apartment. At the door she gave him a brief kiss, the sign that he wasn't invited inside. But when she started to go in he took her by the arm. "You don't really want to be alone tonight. You definitely need some cheering up."

"I need to get some sleep."

He smiled his most sincere courtroom smile. "You aren't going to let Kieko's problem come between us, are you?"

"Good night, Jim. Thanks again for dinner." She pulled free and shut the door before he could answer. She stood frozen in the darkness of her living room, trying not to think about the unthinkable, and miserably grateful that Kieko wasn't awake to hear her.

Sea Pen Six's room A3 looked like a big indoor swimming pool with one wall missing. Beyond it the ocean took an uneasy siesta under the bright sky. But it was glow-panel-lit and relatively cool. About two dozen faculty members sat in the banked rows of observation chairs, as well as Dr. Atwood and Mr. Desicca. Dean Coyne and Sharon stood at the edge of the "pool"—a finger of the ocean—with a young man wearing a swimsuit and a cast on his left arm.

The dean finished his introductory remarks and came to the point of the gathering. "You have all been informed as to the nature of today's demonstration. Some of you may have seen similar ones. Kieko, who is a healer among his kin as well as a student here, has offered to perform healing on a human patient. Mr. Jorgeson has volunteered to be that patient. His compound fracture of the humerus should lend itself well to Kieko's talent. I will now turn you over to Kieko's Guide, Miss Sharon Neary."

Sharon was nervous as she took the proffered hand mike. —*No need to worry,* Kieko assured her. *Everything will eel along nicely.*

She stepped aside with relief. Kieko said through her mouth, "Thank you, doctors and Mr. Desicca, for coming to this demonstration. Since Dean Coyne has explained what I'll be doing, I'll dive right in—so to speak. You've all seen the scanviews of the fracture. At a natural rate of healing it's five to seven weeks away from normal function. Mr. Jorgeson?"

The young man nodded. He looked nervous too. But he quickly stepped off the edge, cushioning his arm as he splashed in. He came up, apparently standing on the bottom, with only his head and neck above water.

Kieko surfaced about two meters from Jorgeson, circled him twice in playful leaps that had some of the spectators smiling, then dove and stayed under.

"I am now flowing into the patient's mind," Kieko explained. "Not the conscious mind, but the unconscious areas that control the body's healing processes. The seascape is different than inside the minds of my pack kin, but not too different, since we're both mammals."

The monologue stopped for almost a minute, as if Kieko had to concentrate totally on this part of the job. Then he continued. "I have control now. As you know, the body's healing systems are very sophisticated, but poorly directed.

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They are subconscious processes, unaffected by volition. But my telepathic/telekinetic gift enables me to direct them in specific acts of healing, with a speed and efficiency unknown in natural healing."

There was a good deal of headshaking at that. Most of the doctors had heard the claim before, but few dared believe it.

"How do you feel, Mr. Jorgeson?" Kieko asked. He already knew, of course—the question was purely for the spectators' benefit.

A few seconds passed before the young man answered. When he did, it became clear that he was unobtrusively throat-miked, because his voice came from the same wall speakers as Kieko's. ". . . I . . . sleepy. Very . . . sleepy. And . . . tired." His words were barely modulated yawns.

"Do you feel any pain in your left arm or elsewhere?"

". . . No . . . nothing . . ."

"That's how it should be," Kieko said to the spectators. "I'm deadening his sensations even as I tell his bone to knit, his blood vessels to patch themselves, and his antibodies to overcome infection. A lot of the patient's physical and mental energy is being focused on the healing."

Another long silence built up. Finally Dr. Atwood asked in her familiar shrill, "Are you offering humanity a medical panacea?"

"Of course not. Like any other technique, it has its strengths and its weaknesses. Otherwise veterinarian services wouldn't be such a big part of our interspecies agreements. Healers are all but helpless in cases requiring any physical intervention—no hands. I can knit bones, but I can't set them.

"In other areas, though, healing is very useful. Diseases. Mental illness. Organic dysfunction. Just how useful is being studied. But the studies go on and on. We can be helping people now."

Nervous and wary looks appeared among the phalanxed doctors. Kieko circled the patient several times, giving him a thorough echo-ranging examination, then swam quickly out into the open ocean.

Sharon, back in charge of her own voice, headed off the rising murmur of questions. "Healing is a terribly intimate mental experience, painful even with patients of his own species. With humans it's even worse. He needs a few minutes away from everyone to recover. He'll be back soon."

Attention shifted to Mr. Jorgeson, whom Dean Coyne was helping up a set of steps out of the water. The young man looked fully awake again, though he moved as if he was totally exhausted.

He awkwardly toweled himself dry with one hand while Dean Coyne wheeled over a portable scanviewer. "How does your arm feel?" the dean asked.

"Fine. Real fine. No pain or anything."

"And the rest of you?"

"Like I just won the Boston Marathon going away. Tired but good."

"Hold the arm out toward me, please." Jorgeson did, and Dean Coyne gently detached the cast. "Now move it, slowly. If there's any pain at all, stop at once."

The young man moved it as if he expected it to hurt a lot. His surprised look

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was right out of an old Popeye cartoon. He swung it vigorously. Then, before the dean could stop him, he dropped and snapped off five quick push-ups. "Hell, it's better than new!"

"If you don't mind, Mr. Jorgeson—" Dean Coyne guided his arm under the scanviewer. The other doctors came over to peer at the green, glowing screen.

"A perfect knit," one doctor said, his words hollow with awe—or concern. "No sign of even a fracture line. No torn tissue. No ruptured blood vessels. No nothing."

The doctors broke into circulating clusters of animated discussion. But Sharon stared at the only two spectators still seated. Dr. Atwood hadn't even bothered to look at the screen. Mr. Desicca was talking to her in a low, urgent tone, but she clearly wasn't buying what he was selling.

—Sorry, pal. Too bad there isn't a surgical technique for prying open closed minds.

—You worry too much. Kieko "sounded" exhausted but happy. *Life is a big game. You can't win, but you can play well.*

—Maybe. But it's the AMA's ball, and they don't want you on the team.

Two hours later everyone except Sharon and Kieko had left. She had put on her swimsuit, and was floating on her back near the underwater fence. They were alone in the ocean world, free from all pressures, and she was rapidly losing her edge of anger.

Kieko leaped over her, spraying her thoroughly. But she didn't mind; it felt good. *—I am sorry, pal. You gave it a good try.*

—You think the issue is settled?

—Afraid so. Your only possible out would be to get your lead bull and the other pack leaders to put some political pressure on, maybe threaten to back out of some of the economic arrangements.

—No can do. It wouldn't be . . . well, ethical is your closest word.

—Then you're out of luck.

—But Dr. Atwood said she was impressed, and even set up the meeting for tomorrow.

—If you're going to operate in human society, you had better learn to read between words. All we're going to hear tomorrow is an elegantly phrased no. It saddened her to set him straight, but she had to. Better her than old Pruneface.

—I suppose I should defer to your better knowledge of your kin, but I'm a congenital optimist. I'll have to hear Doctor Atwood say it.

—Then what?

—Then I'll find another current to take me wherever it is I'm going.

—Well, if you insist on tilting at windmills, just call me Sancho.

Kieko paused. *—I suppose that's one of your literary allusions. Anyway, thanks. You know how grateful I am for your support.*

That made her feel warm and happy in a way she didn't want to dwell on.

—Why not? he asked.

—You know. You've just been polite enough—until now—not to bring it up.

—I've been responding to your feelings. But now I have to bring it up.

—Why?

—Because I think I'm coming to some

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kind of sea-change in my life. I have feelings too, and I have to talk to you about them before it's too late.

The warmness in her swelled. She rolled over and swam as fast as she could, losing herself in all-out exertion. Kieko flanked her. When she couldn't lift an arm again she went back to floating.

—Would you rather not have this conversation? Kieko asked.

—No, let's have it out. The problem with this relationship is that neither of us can really hide anything. But it's . . . wrong.

—Why wrong?

—Because we're too different!

—Outwardly, yes. But healers live inwardly more than our kin, and much more than humans. You can learn how, though—if you want to.

—Don't you feel strange about it? I sure as hell do. It's considered one of the grosser perversions.

—Bestiality refers to animals. I know you don't think of me that way. You're roiling the water.

She was, she knew it; and she hated that he knew it. *—I like you as much as a person can like someone. But the other . . . it's impossible. Even physically. Especially physically.*

He whistled his weird porpoise laugh. *—You know better than that. In your fantasies, at least.*

She trembled. So it was true. . . .

—Yes. Though it isn't something we talk about much, particularly to humans. Healers rarely rise high in the pack pecking order, but we are very popular with the cows.

Her eyes closed, and she saw him in her mind's eye. The sensation that budded inside her was quite the opposite of unpleasant, but distinctly out of place in her present surroundings. Her breathing became quick and ragged.

—As you can see, Kieko finished his thought before he too dove fully into the joining, *control over organic functions can have uses other than medical.*

Even then she could have stopped it with a word. But she didn't.

She was lying stretched out on the sofa, trying to stir up some interest in cooking dinner, when the doorbell rang. She opened the door and saw Jim standing there, grinning. Several emotions bounced around inside her. Annoyance made the biggest impact. "I told you on the phone I was too tired for any socializing."

"I'm not here to lure you out to dinner." His grin looked a bit smugger than usual. "I have some news. About Kieko. Now should I come in or go away?"

She stepped back from the door in silent invitation.

—You with me? she subvocalized.

—Right here. Be careful—there's more than a little shark blood in him.

—Just part of his charm. "Would you like a drink, Jim?"

"Sure. The usual."

She assembled two vodka martinis and brought them over to the sofa where he had installed himself. He had already softened the lights and put Dave Brubeck in the cassette player. Usually she found his up-frontness flattering; tonight it made her wary. The unsettling change in her relationship with Kieko had also unsettled her feelings for him.

"So how did the show go over?" Jim

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asked in his slow Rocky Mountain twang.

"Pretty good." She knew better than to try to nudge him back to the point. "The faculty seemed impressed. Even the dean."

"And the AMA rep?"

"Oh, she was convinced. Unfortunately, in her case belief equals hostility. As I've been trying to tell Kieko all along."

—Your logic is irrefutable. But sometimes you have to go with your hunches.

—Are you adding prescience to your bag of tricks?

—Nothing so organized. But the hunches of a healer can be unusually accurate.

"Well," Jim said, "I've been doing some research on your problem, and calling a few friends in New York. There may just be a way to execute an end run around the AMA. Interested?"

"Is the Pope Korean? I'm listening."

His arm insinuated itself around her shoulders, and began a gentle pressure in his direction. She observed his technique from somewhere beyond her body.

"I think I can pull it off. When do you huddle with the AMA rep again?"

"She's arranged a meeting in the dean's office tomorrow afternoon at three. Then I think she's flying back East."

A flicker of frown crossed his face. "That's cutting it pretty close. But I think I can at least get the gears turning. Can you give me Mr. Desicca's hotel and room number?"

"Sure. He made a point of telling me. What do you have in mind?"

"A brilliant application of my legal expertise. The kind of job that would cost two bills per hour if you came into the office. See how useful it is to have a lawyer for a lover?"

She saw. The *quid pro quo* was none the less emphatic for being implied. If a question wasn't asked, you had no chance to say no.

—This is where you're supposed to tell me not to sacrifice myself for you, she snapped.

Kieko laughed. *—Sacrifice? You never do anything you don't want to.*

When sex is inevitable, relax and enjoy. She leaned toward Jim and tilted her face up to his. Too bad Kieko wasn't capable of jealousy.

Dr. Atwood's gaze followed Jim as he entered the dean's office with Sharon and Mr. Desicca. The three late arrivals found neighboring seats. Except for Jim, the meeting looked like a rerun of the previous one.

Dean Coyne stubbed out his cigarette and said, "Let's get started, shall we. I see we have an unexpected attendee."

Jim was relaxed and grinning. Sharon felt tied in a sheepshank, and loathed him for his calmness. Among other things.

Mr. Desicca said, "Mr. McBrayer is a local attorney, and a friend of Sharon's. He's here on Kieko's behalf."

Dr. Atwood's brow climbed. "This is hardly a legal proceeding."

—It sure feels like one.

—Stay loose, Kieko advised.

"Mr. McBrayer has come at my invitation," Mr. Desicca said, looking directly at Dr. Atwood. She made no reply.

The dean coughed. "I think we're all agreed that yesterday's demonstration

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was fascinating. The full physical on Mr. Jorgeson confirmed that his fracture is completely healed, with no harmful side effects.''

''You're saying Kieko proved his point?'' Desicca asked quickly.

''With one patient? Hardly. But I did some catching up on my journals last night. Study results on healing from the Institutes of Health. Very interesting reading.''

''How would you feel about graduating Kieko as a fully licensed physician?''

The dean leaned back in his chair. ''You're asking hypothetically, of course—I haven't the authority.''

''But if you did?''

''If I did, I would be very happy to graduate him. I think the combination of human medical knowledge and porpoise healing is a significant advance.''

Sharon hadn't expected support from that quarter, and it gave her a quick epinephrine rush. But the focus of attention shifted to Atwood, and it was clear that the dean's comment had had no persuasive effect on her whatsoever. Her expression could have frozen a supernova.

''The demonstration was indeed impressive,'' she began. ''I don't doubt, Kieko, that some beneficial applications will be found for your folk medicine. But decisions affecting the health and safety of the American people can't be rushed. One mended fracture proves very little.''

''It isn't just one fracture!'' Sharon couldn't stay on the sideline anymore. Whatever Jim was cooking up with Desicca—and despite an interesting night he still hadn't told her—she didn't see how it could possibly move this shrewish immovable object. ''As Dean Coyne said, there's plenty of data. But not enough for you. All the proof in the universe wouldn't be enough for you!''

''When you become an experienced member of the medical profession—if you do—maybe your opinion will have some value. Until then, young lady, I suggest you perform your Guide duties and otherwise keep quiet.''

—*You better mellow out,* Kieko warned. *She can be highly carcinogenic to the health of your medical career.*

—*Tough.* She was surprised at how trivial the goal of the last ten years of her life seemed at the moment. ''The AMA might think it can deny the truth to protect its medical monopoly, but it can't! The longer it tries, the worse it'll look in the end!''

Atwood stood up. ''I have no intention of listening to any more adolescent insolence. Dean Coyne, thank you for your hospitality. I have all the information I need to make my report to the Board of Governors.''

''You had better stay a bit longer,'' Desicca said softly. Sharon almost flinched—the gentle insistence was very effective. It reminded her that this bland-seeming lecher was also a high-powered international bureaucrat. ''You might hear something important.''

Atwood was stuck in the middle of her grand exit. She and Desicca traded stares. Finally she sagged back into her chair, from which she glared at him.

The UN official went on. ''Mr. McBrayer came to me this morning with a fascinating solution to our current impasse. After I realized he was serious, I spent several hours on the phone to

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confirm that it is possible. Technically and legally. It is."

"And what is this miraculous solution?" Dr. Atwood demanded.

"We're going over your head."

"Hardly likely. I represent the views of the Board of Governors in this matter, and it's illegal to practice any form of medicine in this country without AMA certification. And our policy on this so-called healing is shared by the other medical supervisory associations around the world."

"You miss my point." Desicca managed to sound smug without any overt signs. "I meant over your head literally." He turned to Sharon. "Kieko?"

Sharon stepped aside. "I'm here."

"Good morning. I have something very important to discuss with you. There's a way for you to become a licensed, practicing physician in a research hospital where your skills can be tested on a wide range of patients. How does that sound to you?"

"That's exactly what I want. But how is it possible without AMA certification?"

"The UN operates hospitals around the world through UNESCO. But they abide by the laws of their host governments *in re* medical certification. With one exception. Have you ever heard of the Harriman Institute?"

"No."

"It's a research hospital specializing in space medicine. Quite prominent in its field, I'm told. Anyhow, it's unique in that there is no host government. Normally certification is by extension of a doctor's own national certification. But I confirmed Mr. McBrayer's notion—UN law permits the Institute's Board of Directors to grant certification upon sufficient proof of skill. According to your school records, you should have no trouble passing an intern board."

"He'll pass," Dean Coyne said.

Dr. Atwood was wearing a thin frown. "Harriman. So that's your game. You may think you can get away with any sort of unethical conduct there, but we can lodge official protests—"

"Lodge away. When Kieko and his fellow healers develop their full potential, and your patients start screaming about inferior medical care, you'll have plenty to protest about."

"You're making a great deal of assumptions. Have you told Kieko where the Harriman Institute is located?"

It was Desicca's turn to frown. "Kieko, the Harriman Institute is aboard the *Spacing Dutchman* orbiting city."

Sharon felt her blood turn to ice and a rock form where her stomach had been. Was that from Kieko, her, or both of them? It didn't really matter.

"I think I have an inkling of what leaving the ocean and your pack for a period of years would mean to you," Desicca went on. "Difficult is too mild a word. At least I can assure you that all technical arrangements will be made for your safety and comfort at Harriman. And you won't be alone—other healers will be invited. The choice is yours. To be a doctor aboard the *Spacing Dutchman*, or the status quo."

Everyone stared at Sharon.

—Kieko, she called. *Where are you?*

—I'm here. I was just . . . thinking. Drifting on the currents of my life.

—I don't understand.

—I think I do. A bit more than before, at least.

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—Tell Desicca to go to hell! You can practice medicine here—we'll find a way!

—No. The change won't be easy, but I can handle it. There are new things to do and learn. I'll be the first of my kin to travel beyond the sky. I've often dreamed of that.

—You're sure?

—It seems to be my destiny.

This time she knew. The tidal wave of emptiness and loss that crashed down on her came from him. And it was just the faint reflection of what he was going through.

The passenger gate area at Vandenberg shuttleport had the typical glass-and-bright-plastic airiness of an air terminal. Only the view from the tall windows differed: sun-shimmering desert, scurrying activity on an endless plain of tarmac, and dominating the foreground the tri-cylindrical presence of the shuttle.

Sharon came out the boarding ramp tunnel wishing she had timed things better. This was going to be no fun at all.

Jim was standing near the ramp, waiting calmly. At least he looked calm. She doubted he really was.

She went over to him. He grabbed her arm and almost dragged her over to the wall, away from the milling clusters of passengers and *bon voyage*-wishers. "Okay," she sighed, "let's get this over with. I've got to get back aboard and make sure he's all settled in for the launch."

"Damn your fish! What kind of move are you two trying to pull on me?"

She desperately wished Kieko hadn't already been sedated for installation in his special tank. She needed him here. "No move, Jim. Not everything in life is a move, a tactic, or a football play."

"I got your damned note. You couldn't even say it to my face."

"I never claimed to be brave. My only regret is not having mailed it from orbit."

"I just can't believe you're dumping me for a porpoise. It would be historic if it wasn't ludicrous. Do you have any idea how this makes me feel?"

"You have my motivations confused. I'm going to the *Spacing Dutchman* with Kieko because he needs a Guide, and because Dr. Atwood's hostility makes Harriman a smart career move for me, too." She had no intention of telling him the real reason. "I'm dumping you because you're a manipulative SOB."

He came up with a very convincing relaxed grin. "I thought that was one of the things you liked best about me."

"It was. But children grow up, and so occasionally do adults."

He turned to leave. "Have a nice life. Too bad. I had big plans for us. Special plans."

He walked away. She got a throttling grip on the part of her that wanted to run after him, and held on. It died a lingering death. She turned and headed for the ramp.

—I'm proud of you, Kieko said.

She almost tripped. *—Huh! You're supposed to be out cold!*

—I am.

She was smiling broadly as she stepped through the shuttle hatchway. She didn't understand. But she had the whole rest of her life to figure it out. ■

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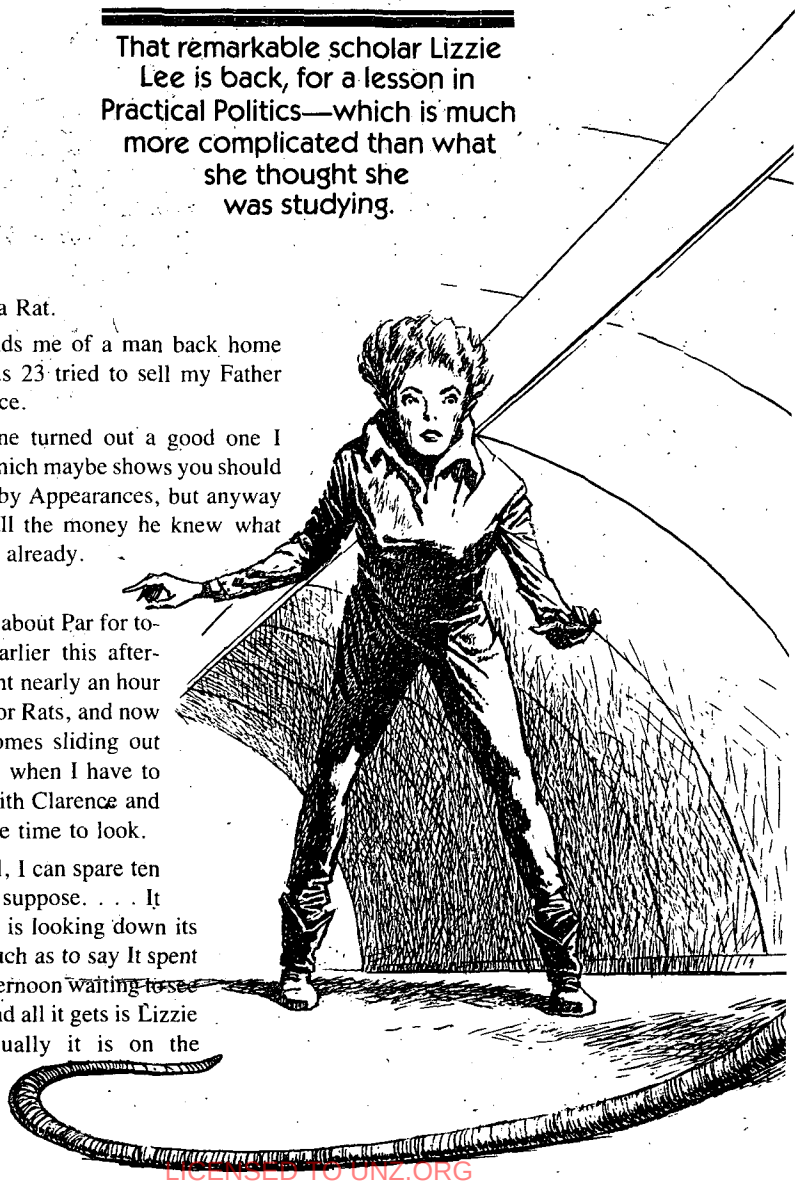
RATS IN THE MOON

Pauline Ashwell

That remarkable scholar Lizzie Lee is back, for a lesson in Practical Politics—which is much more complicated than what she thought she was studying.



So this is a Rat.

It reminds me of a man back home on Excenus 23 tried to sell my Father a Mine once.

The Mine turned out a good one I believe, which maybe shows you should not Judge by Appearances, but anyway Dad had all the money he knew what to do with already.

It is just about Par for today that earlier this afternoon I spent nearly an hour watching for Rats, and now this one comes sliding out of a tunnel when I have to catch up with Clarence and do not have time to look.

Oh, well, I can spare ten seconds I suppose. . . . It sits up and is looking down its teeth as much as to say It spent half the afternoon waiting to see a Person and all it gets is Lizzie Lee. (Actually it is on the

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wrong side of a sheet of One-way glass which to Rats seems the end of the World I suppose). I decide it is Short on Personal Charm especially the tail but considered as Ultimate Horror gnawing the Heart of the Universe my reaction is No.

The Rat turns suddenly and flicks back into its tunnel and I go on my way trying to practise the rules for Lunar Locomotion at Maximum Speed with Minimum Effort. . . . (Sure I am on the Moon, these days they do not allow Rats anywhere else.)

How I got there is kind of complicated and goes like this:

I am a student of Cultural Engineering at Russett College, Earth, and to my surprise I had to go on Vacation.

Naturally I am aware that for Students Vacations form part of the Total Experience, I just never expected to last so long.

When Dad told me he was sending me to Earth with D.J.M'Clare Professor of Cultural Engineering to do my Education it was my private opinion that he had gone Nuts, because he knew perfectly well I had an Educational Handicap or he would have sent me somewhere to College before. However he was too ill to be argued with, so I had to go.

I did not tell anyone about my Handicap because I thought I owed it to Dad to stick on as long as I could and I thought as soon as the Terries found out about it they would send me back home. Because Terries say they did not spend 500 years getting their Pop down to reasonable figures just so as to be swamped by 1,000,000,000 tourists, every Footloose person in the Inhabited Volume wants to visit the Mother of Mankind, so they do not let anyone land unless they have Legitimate Business on the planet. Studying is Legitimate provided you work at it, which you have to prove by passing Exams; there was one at the end of the first semester and I expected to be Thrown out as soon as I failed.

However three and a half weeks before that, M'Clare found out about my handicap and got it put right, and by Studying every minute I actually passed the Exam with a few marks to spare.

Next morning his Secretary calls by Communicator to ask about my Vacation plans: M'Clare as my Temporary Guardian needs to know where to find me, perhaps she might suggest— There is a heap of documents on my desk relating to Holiday Trips for Outsiders, I pick up the top one and inform her I shall be going on a Tour of the Monumental Achievements of Pre-Industrial Man.

She says Really? and I state that I owe it to my Education to go, the oldest work of Man on my home planet being aged fifty-seven and that is a hole in the ground.

She replies that I will find the Tour very Impressive, M'Clare has gone to a Conference but left a message for me, I am to Enjoy myself stay out of Trouble and not forget my Holiday Task.

Hell.

That must mean the Vacation Project Priority Catford handed out four weeks ago, I would just as soon have gone On forgetting it.

The following semester we are due for a series of Seminars on Fictional Concepts in Relation to Contemporary Society and in preparation for this each member of the Class has a Topic to read up and write an Essay on. The first ten

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or even fifteen are on subjects I have at least heard of but mine was number 47 and is entitled *The Concept of Absolute Evil in Fiction of the Age of Impotence*.

Well it could have been worse I suppose, my friend and room-mate B Laydon has drawn *The Theory of Emotional Equivalence as Exemplified in "Cubic of Solomon."* Okay for her she claims to Enjoy Three Dimensional Poetry but that gadget you have to read it with gives me a headache in 10 seconds flat.

I did not complain because I assumed I would be Gone before it was time to hand in the Essay, so now I am Stuck with it; also with this Tour, it is a Circular one and the Office tells me I can join it in Peru if I catch the Transequatorial Ferry in two hours' time.

So I set the Robolaundry to Pack and stuff clothes in with one hand while I hunt the Reading List for the Project with the other, I finally get it set in the Library slot in time for book spools to start spilling out about the time the Laundry starts to deliver also, and what with 2 dozen friends dropping in to say See you next semester I am still shovelling spools and Garment capsules into a travelling bag when my Cab arrives. I have just got it Programmed when I hear the noise the Library gadget makes when it has finished a List, followed by the sound of a spool dropping into the tray.

Oh what the hell I already have books by Anderson Buchan Chesterton Donaldson Ellison Fortune Garner Howard Innes Jacobi Koontz Lewis Merritt Norton Offnut Price Rice Sapper Tolkien Vance Wheatley Yates Zelazny and a few others not to mention several volumes of *Appalling Science Fiction* and *Magazine of Fear and Wonder*, one more cannot really matter, I lock the window and Go.

I am much Impressed by Cuzco and Machu Picchu which were built by hand of Stones cut square with Stone tools, also by Newgrange Stonehenge Carnac Lascaux Pompeii Rome Knossos Delphi I am not sure at what point Impression first becomes tinged with Depression but as we go on to Petra, Baalbek, Nineveh, Gizeh it deepens and halfway round a temple called Karnak I realise I am finished, done, if I have to look at one more Sight Site Saite or whatever I shall justabout pop a convolution.

What I need now is a Rest somewhere with no History at all.

Then I see the Moon rising over this very Historical river the Nile and realise that is just what I require, Oh sure Man first stepped there 800 years ago but all the Buildings are still in use, no Ruins, no Monuments except a plaque saying *Neil Armstrong Stepped Here;* also I have a friend there, Clarence Dalrymple, waiting for a new Heart and meanwhile has a job looking after Rats.

Why this is relevant, having read the marked sections in 2/3 of those books I still do not feel I have the hang of this Evil thing; the books are full of words like Unnatural, Abominable, Monstrous for which the Authors seem to use a Dictionary I don't know, but whenever they want a real concrete symbol of Evil, half the time what they use is a Rat.

It seems Rats are very Evil being Fundamentally Inimical to Man.

So okay, maybe it won't Help to look at one but it can't Hurt, I arrange to

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travel by Lift the following day.

Landing on the Moon from Earth has not much formality, you stick your passport in a slot and walk up a dim tunnel using Lunar Locomotion as taught on the Lift (the last 6 hours of the journey are done under deceleration at 1/6 G so everybody has been able to Practise) while various machines check you are not carrying Concealed Weapons or Diseases and your face does not match any of the Million Most-Unwanted, then you get your Passport back at the top and can catch a Slider to your Hotel.

Would you believe it the first thing I see as we emerge from the Space Gate is a parade of giant red letters saying HISTORY IS BEING MADE HERE!

Then they reform to read FIVE PLANETS CONFERENCE and I Relax, there was some talk about this on the Lift; it is just Cincinnatus Lamartine Discus Karel and Ved being Got Round A-Table at last; no doubt the sorting out of quarrels been running ever since the planets were settled is History but not the sort to cause Monuments.

Plaques, maybe.

I had to cross 11 Time Zones to get the Lift and had no sleep on board, so having checked in at my Hotel the Royal Cynthia I go straight to my room stick my clothes in the Robolaundry and Throw myself at the bed, such is the effect of Moon G that I am asleep before I hit.

When I wake up I have missed half the morning so after dialling breakfast and flicking the first outfit to hand out of its capsule I start out to get in touch with Clarence. The whole Pop of the Moon would not fill one small city back on Earth so there is only one Directory and when I key in Clarence's name I get a number right away; but when I transfer that to the Communicator I see not Clarence but a woman with Remarks embroidered on her tunic reading SUPERVISOR AMBULANT EFS.

She is Not very pleased to meet me and wants to know Why I am attempting to communicate with Clarence, I explain and she softens somewhat and says Oh yes Dalrymple has mentioned me.

However he will be in Supportive Therapy all morning. I exclaim Good Lord has he got Worse then? but she says No, his condition is stable but it will be seven months before the new Heart being grown from his tissues is mature enough to graft, meanwhile the old one needs all the help it can get. Seeing me should not do Dalrymple any harm however if I obey the Rules, she will have him call me this afternoon.

I say I would just as soon come and See him in person then, she looks surprised and says Am I in Labsville, then? I knew this was a town 200 km from Lunarburg but had not realised what this means in Moon terms, viz. going there is a Major Undertaking. There is a tunnel running between the two but traffic is One Way, meaning One Way at a time, a single train goes from Lunarburg to Labsville taking 2 hours for it and then after a 20 minute turnaround it runs Back again. If I want to visit with Clarence for more than 20 minutes I must be prepared to spend 8 hours on it.

Well okay that is still what I came for; it is already too late to start out today so I say Tell Clarence I will come out tomorrow by the train leaves here 09.00 gets in 11.00, unless I hear to the contrary; and she promises to do so.

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So now I am free to work on my Project, dammit.

According to the Brochure this Hotel has a Commodious Reading Room so I set out in search of it. Evidently this is in the oldest part of Lunarburg, tunnelled before they learned how to make a Disruptor cut square; all the passages are tubular and the Reading Room has been cut by driving three tunnels parallel and overlapping and then scraping the Ridges off the floor. The ones on the Ceiling are still there and the bulges at the sides have been screened off except for three alcoves with Reading Machines in them, two occupied, one not.

However I do not observe this straight off because the rest of the room is occupied by about a dozen people engaged in Competitive Conversation, and not a single one looks any younger than 70 years old; if the Lunar Handbook is right and living on the Moon takes 10 years off Apparent Age they must all be well over 80 and they are all looking at Me as much as to say What is this twenty-genarian doing in Our Hotel?

Before I can sink any distance into the floor I am rescued by a small Fluffy lady in pink who flutters over with Remarks wafting ahead of her: "Oh, my dear, I really must apologise, you must be Miss Lee of course, I really meant to be there when you arrived but the General, so difficult to make up a four since poor Mrs. Ogbanishah left us, I did peep into Reception but the Porter told me you had already gone to bed, if there is anything I can do to help you any time do please let me know."

I say Nothing, thanks, I would just like to use that Reading Machine.

She seems distressed and says Oh but the Colonel will be here any minute now.

I am not looking for a Colonel I just want to Read.

She says Oh but *really* the Colonel will be here any minute.

Bysitters now take a hand and I finally grasp that The Colonel always reads the *Lunar Times* from 11.30 to 12.15 on this Machine.

Well When will one of the Machines be free? after a lot of discussion it is finally borne in on me that these Machines are booked to the Permanent Residents one after another right through the day, the reason one is Vacant right now is that the Lady using it met an old friend unexpectedly in the Obituary Column and has gone to write a letter to the Relict.

I thank them for the information and Go.

I will just have to hire a portable Machine somewhere.

The Pink lady who is apparently the Manageress has fluttered out after me so I ask her Where and she lends me an Autoguide set for the nearest shop. I find the place all right but return in a state of Shock; they told me Living on the Moon was Expensive but this is Ridiculous.

She is still in Reception and asks how I got on, I am still searching for words that will not be Unsuitable when she says Many Transients are surprised to see the effect of Freight charges on the prices here.

The hell with that, Freight costs a lot more to Excenus 23, but I am feeling Insulted; the man in the shop refused to hire me a Reading Machine although the sign in the window distinctly promised

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he would, I offered to Deposit the full price but he seemed determined all Transients were in a Conspiracy to cheat him, in the end I had to Buy the damn thing.

It is second hand and cost 3 times as much as the better one I left at the Lift Terminal on Earth. The Manageress puts on enough distress for politeness and says A nice girl like me would never imagine the dirty tricks some Transients get up to, it is so easy to hand in a damaged gadget when the Hirer is too busy to check it, claim the Deposit and go on board before the owner finds out what is wrong. Once on board the Captain usually will not permit Passengers to be taken off, it upsets the Manifest, so it is very difficult to make them Pay.

I say But according to the Lunar Handbook there is some new Law or Court or something that allows a man to be arrested by Bailiffs on a civil complaint, up to 10 minutes before Liftoff. She looks totally puzzled for a moment and then says "Oh! You mean the Piepowder Court! But, Miss Lee, that is only for Transients; it's no use to *us*."

She insists that the Court with the funny name does not act on complaints from anybody with a Residence permit for more than 2 weeks; this seems more than odd as How many people find things to Sue about when they are only here for a day or two? surely not enough to make a special Court worth while.

However I finally understand that the Complaints usually relate to events on the long voyages before arriving at the Moon, lots of business is done on the big Interstellar liners and some of it goes sour, also there are Conmen among the travellers. If a sucker is cautious enough to register his purchase of Waterfront lots on the Martian canals, or whatever, soon after touchdown he may discover that he has been Had before the Haver's ship leaves the Moon, in which case the Respondent can be taken off by Bailiffs even if the ship is just about to go. It still sounds odd but the Manageress gives me to understand it is mostly a Gimmick to make Transients feel that the Moon really takes care of them, there is a drive on to encourage Tourists.

I retire to my room and get to work. Clarence calls in the afternoon and will be Pleased to see me tomorrow, he looks much fitter than when I saw him last, this thing about Low G taking the strain off a Bad Heart really does work: I finish the last of the books and go to bed early.

I spend the train journey next day planning my Essay.

When I started this Project my first impression was that the only connection between Absolute Evil and Social Conditions was that the Authors of these books had a living to make; I mean when they thought of a Plot which called for some Picturesque but wicked proceeding and there was no reason in the Universe why any sane person would Proceed in that particular way, then the Motive can be Absolute Evil. Like when a Good Guy has been a nuisance to a Bad Guy and the Bad Guy has got hold of him, you would expect the Bad Guy just to Shoot the other one and that would be That. But an Absolutely Evil Guy will dream up a nasty form of Execution and even then he does not get on with it but keeps the Good Guy waiting in order to Gloat.

So of course that gives the Good Guy time to be Rescued or to get away.

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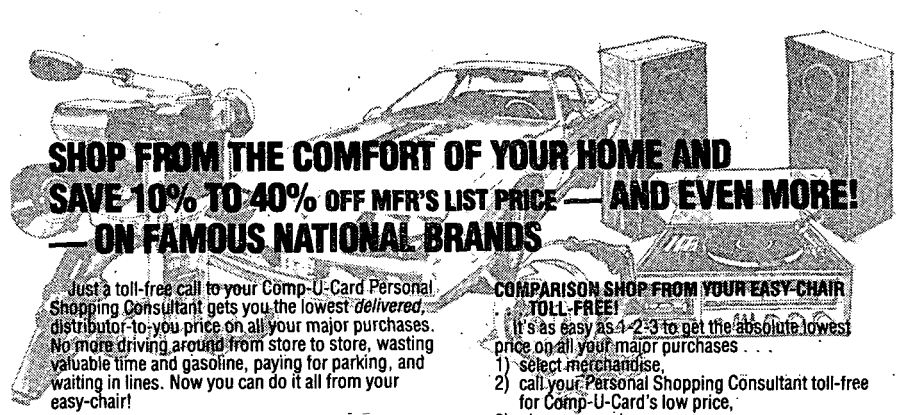

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Gloating is very Evil and it is Inefficient, too.

One trouble is I do not know much about conditions in the Age of Impotence, in fact I never heard of it till this Essay. B Laydon lent me a Work called Pocket History of World Literature from the Earliest Times, it has so many spools I guess it nearly would fill a Pocket at that; this says the Age of Impotence is a name for the middle 60 years or so of the Twentieth Century, so called because the great Message of so many writers was simply that they Could Not Cope (it was also a time when the sexual sort of Impotence was fashionably blamed for everything from Murder to Materialism but apparently that is *not* the point).

This book says Guilt was a very popular emotion in Literature of the period and the books I have read seem to confirm it, seems you were supposed to feel guilty about Injustice and Deprivation suffered by anybody anywhere whether you had anything to do with it or not, Never mind whether this attitude was Socially Useful; the Authors seem to have felt people including Bad Guys had a Human Right for Good Guys to feel guilty over clobbering them no matter what Wrongs they had done. However those who indulged in Absolute Evil could be counted as *in*Human; sometimes this is just an excuse for them to be extinguished in a complicated and Sadistic manner but sometimes it is More than that: Evil could be dealt with decisively and even Heroically without any need to feel Guilty afterwards and I can see where Authors and Readers both might find that a Relief.

I begin to think I have Got something and get busy finding suitable Quotations, I am still doing this when the Reading Machine tugs gently at the straps behind my head and then slides back and raps me between the eyes; the Train which without my noticing it has been standing for some time in the airlock just before Labsville has now made the final push into the Station and people start to get out all round.

I shove the machine hurriedly into its case and grab my pouch of book reels and step out on to the sidewalk just in time to see Clarence's back walking slowly towards the other end of the train.

I remember not to yell in case it startles his Heart; then I take off after him fall over my feet stop to remember where I am and finally manage to get in front of Clarence just as he reaches the last door of the train.

What the devil is wrong?

For a moment he does not seem to Recognise me; then he says heavily "Oh. There you are, Liz."

He reaches out, takes my Reading Machine and pouch and slings them over his shoulder, then turns and leads the way into a sort of Foyer.

Clarence does not look like a man with a bad Heart, he is big and broad with Muscles to match. He is wearing ordinary tunic and trousers, not Hospital clothes, except he has an armband with big black letters $^{E}_{F}$ one under the other and little letters beside them which I cannot read because of the creases. The puffiness has gone from his face but it is set like Cement in a No Expression and if yesterday he was really Glad to know I am on the Moon, this morning he is Not.

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It is right on the tip of my tongue to ask What Gives but I am doing my best to Keep it there and not let it off; once on the ship from Excenus M'Clare told me "Never bother a sick man with silly questions and remember any question is Silly unless you know what to do with the Answer." If I ask Clarence whether this visit is Mistimed he will either not hear me or say "What an Idea!" and start Exerting himself. If he wants me to know what is on his Mind he will tell me. So the only question is Should I stay here or get Tactfully back on the train and go away?

Only it would not be Tactful if he suddenly remembers and finds me missing, that could start a Moonwide womanhunt; besides he is carrying my Reading Machine. . . . At this point I learn what is written on his Armband, there is a poster on the wall with the same black letters but now I can read the little ones which say "xertion orbidden." Under them it says in red

MEANS
EXERTION FORBIDDEN

Then in black: *Do not on any account ask wearers of this armband for physical assistance. They must not under any circumstances be hurried or harassed. If any wearer of this armband seems to be ill or in difficulties go to the nearest Incom box and ring 1111.*

(Illegible Squiggle)
DIRECTOR
HUMAN HEART FOUNDATION

Presently the Elevator arrives. According to the Indicator there are VII Levels and the Station is on Level IV; we go right up to I and I follow Clarence off. He leads me a little way down a corridor—Labsville architecture is cut Boxy rather than Drainpipe—and into a little space with doors on three sides, and Switches himself on.

I mean suddenly he seems his normal Self; he looks me in the eye and begins to speak.

This is a mild shock because always before he spoke Standard which is a sort of colorless flavorless Essence of Communication without Racial Social or Planetary overtones, most people use it on Excenus 23 because we have people from 50+ planets each with its own unintelligible Localese; what Clarence speaks now is Something Else.

"Liz m'dear, according to the Supervisor you want the Grand Tour and let's face it, I'd be a washout. I don't get the sense of a quarter of what goes on round here. But so happens a bunch from this Five Planets jamboree are swanning over here today and three of the junior Eggheads have been laid on to show 'em around. I had a word with the Great Panjandrum and he'll be happy for you to tag along. Then I'll meet you for lunch and we can go on to have a squint at the Rats; they aren't on the Five Planets itinerary; not enough class. Okay?"

Okay; the only problem is Not to show how relieved I am.

The Five Planets party are on the far side of one of the doors, in a large space which comes the nearest to plushy of anywhere I have yet been on the Moon; it has a carpet instead of plastic coating and there are Murals on the wall, depicting mythical Moon fauna I think. Several people in lab coveralls are passing round coffee and cookies but I am not thirsty and don't know anyone so

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I pass the time studying the pictures. Presently I decide to look at those on the other side.

Halfway across I run into some Legs.

There is a Body on top also long and knobby and so are the arms, but it is the Legs make themselves conspicuous: I try to sidestep and we have a bit of this-way-that-way, every time I try to Dodge in a particular direction so does he, I do not know whether this is accidental or a Joke but presently I give up and go back the way I came.

There is a sound behind me which might be a Voice but at that moment the Eggheads we are all waiting for come in and ask us to divide into 3 groups and each go out by a different door.

I do not want to put myself forward so I wait to tag along behind whichever group turns out to be the smallest; Something makes me turn round and I see Lanky with the Legs talking to one of the men who handed coffee and they are both Looking at Me. This reminds me uncomfortably that whenever I went to a Sight on Earth I had some sort of Permit and here I have none. I wait to see which party Lanky will join but he just goes on glaring at me as though wondering By What Right—? in the end I glare back and he turns suddenly and dives after the tail end of one group, and I tag after another.

The Tour is fine if you like Laboratories: I should say most of this group can Take them or leave them alone. There are polite Ohs and Ahs when some Technological Marvel does its stuff, otherwise they are mostly enjoying a good gossip, I wonder why they are here instead of Conferring in Lunarburg but presently conclude that the Top People are having a quiet day together for Horsetrading Hornswoggling and other Political Pursuits and have pushed the Second Strings and Encumbrances off here out of the way.

There is one man in the group however seems to feel he is here to Work, a short solid man with a corrugated face looks like it has been crumpled while soft and the folds have then set hard. He is one of several who have Labelled themselves, his label reads SENATOR G. GASSETT-LOW. CINCINNATUS.

The way he Works is to ask the cost of everything, in an accusing voice. I think half the time the Egghead does not know but manages to keep a straight face while Making it up; finally the Senator forgets where he is and asks how much the Cincinnatan Taxpayer—here the Egghead nips in smartly with Nothing at all: Experiments on this level are funded entirely from Earth.

The Senator makes a recovery and asks How about other Levels, then; the Egghead replies that Labsville has a few projects of special interest to certain planets and funded partly by them, but so far as he knows Cincinnatus only contributes to the Antibody Reserve Production Fund like the rest of the Outer Worlds, the Production unit is on Level VII.

A voice in my ear murmurs "Poor old George! If only he knew!"

I am being addressed by a Strange Man.

Not all that strange, he is one of the Five Planets party and I heard him being addressed as Tolly in tones indicating

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that if he is on the Second String he must be near the Top of it.

My Mother did not tell me Never to talk to Strange Men because she left when I was 2; every other adult woman in Excenus 23 must have told me that one time or another but Dad's injunctions were more about Judgement and Common Sense. Common Sense tells me I cannot get into difficulties in the middle of a crowd and Judgement tells me this man is far too comfortably set in his own niche in the Universe to be dangerous to girls young enough to be his daughter.

Grand-daughter maybe, he has that Well Preserved look. He is not handsome but full of Presence and Charm. I have had enough of being Instructed and feel ready to be Charmed for a change so I murmur back "If he only knew what?"

He flashes his smile at me, a good one even if he has Practised it.

"The Senator equates Public Expenditure with Public Waste; that's the one political principle he really is quite sure about, and how he loves to apply it! So it's bad luck that the only project here on which his planet has spent money should be an absolutely impregnable Sacred Cow—don't you think?"

He twinkles his eyes and waits for me to spot that there is More to Come; it is like being back at Russett in a Seminar but I may as well play up.

I say "Sacred Cow? You mean the Antibody Reserve?" I fake a bit of shock to keep him happy but come to think of it maybe I could supply the Real Thing.

I mean the Reserve Antibody Production Fund is one of the very few examples of all planets working together for the Common Good; it saved thousands of lives during epidemics on Miranda and Lemonchik and Yudhistrira, millions if you count the people on other planets who might have got the diseases if they had not been Stopped. It was in my very first History book.

Tolly smiles again to show he Understands.

"Don't take me wrong, m'luv, it was a great idea when it started. Trouble is, it's out of date. The point is to have stocks of vaccine ready to be rushed where they are needed, right? But what actually happens if an epidemic breaks out on one of the Outer Worlds, these days?"

I think back to the last time somebody landed on Excenus 23 with a cold in the head, back when I was 8, and say "The planetary Hospital makes cultures and grows a vaccine of its own."

"Right! With modern automated plants they can get vaccines tailored to the precise strain involved, in ten days or so, whereas to get it from the nearest Regional Depot might take several weeks. . . . A good many of the Scientists here feel that the Sacred Cow has grown into a White Elephant. They'd like to be able to use the space and manpower for something else."

I say "Why don't they? Labsville is run by the Scientists, isn't it?"

Tolly shakes his head.

"No, m'dear. When you get down to bedrock, no. The scientists get the use of the facilities, but they don't own the place. It was set up originally by three or four big charitable foundations and they still have control. Why d'you

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think heart cases are employed to carry out simple routine jobs when it would be so much simpler to use automation? Because about two-thirds of Labsville belongs to the Human Heart Foundation. It wasn't excavated originally for scientific purposes but to house and treat anybody with an incurably bad heart who could get himself here, and supply him with a new one, free. A handful of really rich men who didn't want to burden their families with too many billions set it up. Then the medical staffs found that keeping men around for a year or two with nothing useful to do created problems in itself. So they offered space and facilities and grants to any scientist who'd design his work so as to provide jobs for EFs. Tricky—a lot of brilliant men have walked out in disgust over the difficulties. Lot of others have made their reputations here, though. More EFs the scientist employs, more space and money he gets from the Foundation . . .

"However, they don't own Reserve Antibody, of course. The snag there is the Lunar Gov. They don't want it cut down."

I say "Why not?" and Tolly smiles again.

"Tourism, m'dear. It's the biggest sight-seeing attraction on Luna. Practically an Ancient Monument."

The whole party has been walking for some time down several of the long steep slopes they have here instead of stairs, and right now we are entering the Department of Reserve Antibody Production, so when I wince I guess Tolly takes it for a start of Amazement or maybe Awe.

It is a huge long wide space that looks very low because of its Proportions, actually the ceiling is five metres up which is high for Labsville but the effect is that we have all crawled into a vast horizontal Slot.

The Culture Units are enormous glass sausages, they rest on cradles which can be Swung Tilted or even Shaken and inside are more glass Compartments Channels Racks Plates and so on than I can distinguish. The cradles pivot on thick glass columns with liquids flowing inside, these reach the Ceiling and appear to hold it up but being transparent they give me a feeling of Insecurity.

Tolly has gone off to charm somebody else. The Egghead is busy explaining why it is Not dangerous to breed pathogens *en masse* in a totally enclosed Armourplated environment; this is not what worries me, I am prepared to believe the Authorities know what they are doing, what I do not enjoy is the Impression that the ceiling is slowly coming down as in one or two of the books I recently read, so I make unobtrusively for a way out.

There are several very wide gaps in the side wall making this place more or less continuous with the corridor beyond; I am in mid-stride and nearing Escape when there is a shout behind me of "Junior!" Would you believe it Lanky appears suddenly before me on a collision course.

We each put down a toe and manage to Steer sideways and this time he goes the opposite way and Rebounds off the side of the gap. I stop politely to see if he has broken anything but when he untangles his legs they seem to be Working so I go on my way.

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It is time to join Clarence for lunch.

The Cafeteria is another great big slot, I think perhaps I prefer my Architecture tubular but at least this has pillars of solid rock. Clarence still has Things on his Mind but is putting a lot of effort into being an Entertaining Host so I fix my thoughts on being Entertained and by common consent we get through the meal quickly and prepare to go.

On the way out Clarence is nailed by a Senior-looking Egghead and I withdraw out of Earshot, at least I thought I had until I heard the Egghead exclaim "Why in Luna should she object, under the circumstances?"

Turns out two of the Five Planets party want to see Rats and the Egghead wishes to attach them to Clarence and me.

No of course I can't object. We arrange to meet them in the Rodent Habitats section in ten minutes' time; now I shall never learn what is eating Clarence I suppose.

The Rats inhabit long oblong blocks separated by corridors; Clarence switches on a red light inside one of them and shows up an absolute hurrah's nest of tunnels going Up down and along at every angle but all sooner or later turning inwards and out of sight. He explains that all the Scientific observations are made by Sensors inside the block connected to Computers and Screens, the glass panels are just for sight-seers like me.

Also like the two members of the Five Planets party now approaching under the escort of the Senior Egghead, Oh Hell and Handbaskets they are the Senator from Cincinnatus and Lanky Junior.

The Egghead introduces Senator Gossy Lowell and his Nephew and departs.

The Senator is Not pleased at being misnamed and puts that right in a gravelly growl, adding that since his Nephew insists on seeing Rats we might as well get on with it.

Okay by me but unfortunately the Rats do not co-operate.

The first block is full of wild-type *Rattus norvegicus*, according to Clarence, who has started to recite their History when the Senator who has been inspecting a notice affixed to the Environment interrupts.

"That's all written out here. We can read it for ourselves."

I state loud and clear that I am using my eyes to look for Rats and would like Mr. Dalrymple to Continue, please.

The Senator gobbles, Junior utters a faint snort, Clarence goes on talking and I continue to watch for Rats which would be Sucks to the Senator except that there aren't any.

Rats, I mean, after 20 minutes we decide there must be something Special going on in the middle of this block and move on to the next.

The next block is inhabited by a Mutant strain with white hair and pink eyes which must look especially Evil I think, but unfortunately after another 20 minutes I am still unable to Confirm this.

It is all just a Statistical Accident otherwise known as Bad Luck but the Senator decides it is a Conspiracy. Junior starts to say something but is snapped to silence by his Uncle who demands that Clarence take them to rejoin the rest of their party. Clarence starts to insist on my Right to see a Rat if it takes all Night and he is Not going to leave me

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here alone; so I look at my watch and announce it is time to go for my Train. I bid the Senator and Junior a Distant farewell and Clarence a warm one and set off.

Actually I have 50 minutes before the Train which is just as well, in the rest room at the Station I discover I have not got my Reading Machine or the pouch of book reels, Clarence having taken them over by Politeness reflex is still carrying them.

No help for it I have to get them back even if I miss the Train. I start Retracing my steps. These were quite numerous and I forget some, it takes me twenty minutes to find Rodent Environments; where I suddenly realise Clarence is now Somewhere Else.

This is the moment a Rat chooses to come out of a tunnel and Look at me, I begin to suspect they really are inimical to Man or at any rate to Me.

There is the Incom system, a series of communicator boxes every 100 metres or so, maybe I can call somebody and ask where Clarence is.

I have gone about 3 Lunar paces when the most godawful Wailing noise breaks out all round and I Jump so hard I literally hit the Roof.

When I Descend the sound is starting to drop also, right down the scale like a Cosmic mucksucker lamenting the Dead; then it is replaced by a Voice.

"ATTENTION PLEASE.

"Those of you who work here will have recognised the Emergency Siren. We apologise to any of our visitors who were startled."

This Means Me.

"Because of a slight mishap, access to this Level is temporarily closed. If you will all go as quickly as you can to Room Seven See Twenty-three, following the illuminated arrows, a member of staff will meet you there and explain. There is no cause for alarm, just a temporary local hitch in the arrangements for your tour. Please follow the illuminated arrows to Room Seven See Twenty-three."

I would be glad to but there is a Temporary local Hitch, viz. No arrows in sight. However the lights now start to dim and arrows gradually become visible on the floor. I start to follow them as fast as I can. This is not very because I have somehow forgotten all I learned about locomotion at Low G; so I stop and take a deep breath and start Exercising as directed on board the Lift and presently I am proceeding in high gear touching the floor about once every three metres or so.

I have done this about 200 times and made several Turns when my foot touches something in mid glide and I trip slowly over and land on top of it.

Who the hell left that here and what is it anyway? —I sort myself out and it makes a faint Moaning sound like a distant echo of that siren thing, Oh Stars it is someone lying here Hurt and Unconscious, now what do I do?

Illumination has got even dimmer, those damn arrows are glowing like crazy but I can barely see that what I fell over is long and skinny and wearing tight dark clothes: then I see there is something light on the shoulder blades and by peering close I make out the letters CINCINNATUS.

In short this is Ghastly Junior.

The short fair hair at the back of his

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head has a dark patch on it that comes off on my finger.

Blood, I suppose. However the pulse in his neck is beating all right.

Head Injuries you should not move around but leave them to Professionals; I stand up and holler "Help!" half a dozen times.

No reply.

If only I knew what type of Emergency this is, for all I know Junior is as safe here as anywhere; but also for all I know some sort of Venomous animals kept for Antitoxins may be loose; or a horde of Mutant Rats; even the Plain sort have been known to Eat people who could not get away. But—

"ATTENTION PLEASE. ANYBODY ON LEVEL SEVEN WHO HAS NOT YET REPORTED TO ROOM SEVEN SEE TWENTY-THREE PLEASE DO SO IMMEDIATELY. FOLLOW THE ILLUMINATED ARROWS TO ROOM SEVEN SEE TWENTY-THREE. THIS HAS PRIORITY. DROP EVERYTHING AND COME RUNNING TO ROOM SEVEN SEE TWENTY-THREE AS FAST AS YOU CAN."

That settles it.

Junior's head has a lump on it but it does not feel cracked, I still do not know whether it is safe to Shift him but that also applies to leaving him where he is, so here we go.

I roll him over carefully, sit down alongside with my back to his head and haul him into Sitting with one arm and his head hanging over my shoulder, then I grip the arm and stand up.

Even in 1/6 G this is not so easy as it sounds, he is so damn long and I don't want to jiggle him, all the same I am not able to tote him more than a few steps without a Readjustment which provokes another painful-sounding groan. I say Is he all right? and Can he answer me? the answer in both cases seems to be No.

Well since I have Moved him now I had better get help quick; I turn and shuffle off following the Arrows as fast as I can.

I suppose Junior only weighs about 12 kg but I am not used to having even 12 kg of Person draped over my shoulder and dragging on the floor behind; presently I become aware of a Soughing of air, loud and rapid, which after a bit I realise is not the Ventilation system on the blink but just Me.

Later I find the distance gone is only about 150 metres but it feels More.

About ½ way there I become aware of Movement ahead; a dark figure crosses my field of vision and moves into a panel of brightness that opens up suddenly about 50 metres away. I try to shout but have not sufficient Breath; all the same, Excelsior! that must be Room VII 23 C—

It is.

According to the label it is also *Mass Immunisation Bay* but Who cares? I have hell's delight trying to get the door open without using Junior as a battering ram and in the end just kick it until somebody jerks it aside. They give an exclamation and I stagger in.

Inside is a positive Glare of light and I screw my eyes up; I get a confused picture of Things; and people, mostly standing in line alongside a glass-and-metal covered trolley but there are a few in White coats scattered around. I select

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a large one and lower self and Junior to the floor at his feet.

Tell the truth I can't stand up any longer.

Somebody gives a loud exclamation and lifts Junior off me.

Somebody else takes my hand and hauls me to my feet.

Somebody yet else—a woman by the sound of it—screams at the top of her voice "Blood! She's all over blood!"

I look down at myself.

It is true. The left side of my tunic has a great red patch and trickles have run down to the hem.

Have I killed him?

Then everything whirls into a sort of bright hazy cocoon and goes away.

Migod what a collection of aches, I am stiff all over and who raked an incinerator into my Mouth—?

Something touches my head lightly.

"Miss Lee. Wake up, Miss Lee."

Glad to oblige, so would anybody be who just had my dream.

There is a lot too much Light on my eyelids but through a slit between them I make out a smallish solemn-looking man with black hair brown complexion and a label on his white coverall reading DR PATEL.

I try to sit up and discover the Stiffness is not all my own, I have been Zippered into one of those sleeping bags used in Free Fall and it is tied down to a cot or something; this particular bag also has wrist straps and some idiot has fastened them.

Soon as I realise this a Spot on my arm starts itching like crazy.

DR PATEL picks up a Free-Fall drinking bottle and sticks the spout into my mouth, it tastes so good I forgive him the Liberty.

When I have emptied it he frowns at me and says there are some questions he must ask, do I feel well enough to answer them?

I reply Sure but let me sit up first.

He has a written list in his hand and now frowns at that. "First, can you explain how you came to be carrying Senator Gassett-Low's nephew and—"

Junior!

I give practically a yell: "Junior! How is he? Was he badly hurt? Have I damaged him—? He isn't *dead?*"

He jumps a little. "Dead? Certainly not. A moderate concussion only. It is yielding to treatment."

I say "But all that blood!"

"Oh, that? A nosebleed only. Now, Miss Lee, can you explain how you came to be carrying him and what caused his injuries?"

Sure I can, at least the first part, and I do.

"But you have no idea how he was rendered unconscious?"

None.

"Nor how he came to be lying in that particular spot?"

Even less.

"Miss Lee. I am informed that after lunch you accompanied Senator Gassett-Low and his nephew on their tour of the Rodent Environments, with an EF named Dalrymple as guide?"

Is he, indeed? Well Never mind whose tour it was: I agree.

"You left the other three at approximately 15.30 in order to catch the train to Lunarburg, which does not however depart until 16.20."

True enough.

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"To walk from the point at which you left your companions to the point of departure of the train takes between ten and fifteen minutes if one does not linger on the way."

Well I stopped in at the Restroom —funny, feels like that was quite a while ago.

"The Emergency Siren was sounded at 16.05."

I try to look at my chrono but can't.

"Miss Lee. How did it come about that when the Alarm sounded you were still within the confines of Level VII?"

I say "How long have I been unconscious, forgodsake?"

He frowns and repeats his question.

I frown back and repeat mine.

He coughs and glances at his chrono. "About—six hours. Now—"

"Then who Drugged me, and why?"

I mean I never fainted in my life, granted this is an Exception I would not have stayed fainted more than a few minutes; also I woke up with a Muzzy feeling fast being dispelled by adrenalin now.

Dr. Patel fidgets briefly, then decides to reply.

"When you arrived at the Immunisation Bay the police had not yet come. The tourists were much disturbed. The Director had ready a sedative hypospray in case of hysteria. When you collapsed at his feet he thought it better for you to be removed at once for medical attention along with the young man, rather than immediately to become the focus of another hubbub. So he gave you a small dose."

I suppose I see his point but What bloody cheek all the same.

"Now. Can you explain—"

Well, he did answer my question, so I do.

When I have finished he Thinks visibly.

"So your portable Reading Machine and the pouch of books should be among Dalrymple's possessions? I will see that they are at once restored to you."

I cry "Hey! Loose me, first!" but he Strides from the room through one of the five available doors—Actually this is hardly a Room at all, just a bit left over when they partitioned things off, it has more doors than wall and a lot of things plainly Left here till wanted—

If they think I am going to be Left here till wanted they can think again.

Even with my hands on a three-inch tether I can tell my tunic has been replaced by something loose and Hospitalish but I do seem to have my own trousers and there is a knife in the pocket if I can only get at it.

This takes some very fancy squirming, not only are my hands Restricted in scope but the sleeping bag was designed for an advanced case of Emaciation.

Or for somebody under Restraint.

Why the hell—?

But that is fairly Obvious, I am Suspected of something. Unjustly, of course.

Well, it has to be unjustly, I haven't done anything since I came to the Moon. Not a single damn thing.

As to *what* I am suspected of, a moment's thought makes that Obvious too, or does it? I mean if they think I hit Junior on the head why do they suppose I took the trouble to carry him half a kilometre afterwards? (It *felt* like that anyway.)

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Well whatever the Reasons if I want to escape I had better get on with it before Dr. Patel comes back.

After a couple of uncomfortable minutes my Hand gets together with my Hip pocket and I manage to tease the knife out to where I can get a grip; thirty seconds later I have a hand free and the first thing I do is Scratch the spot on my arm which is driving me Mad.

Not much satisfaction, it is covered with something slick and Scratch-proof.

I can cut my other hand free at any rate.

I now find this sleeping bag is not regulation Model even for Human Skeletons, the tab of the zipper is outside and the bag fits round my neck so close I cannot get a hand out.

Do I slash it open with my knife now or do I Lie Low?

The latter, because Dr. Patel comes back.

"Miss Lee. No Reading Machine or books among Dalrymple's possessions. Can you explain this?"

I say No, Can't Clarence? and Dr. Patel frowns some more.

"It was thought better to put all EF personnel on this Level under deep sedation, because of the strain of this Emergency."

After a moment this translates to mean Clarence is Asleep.

"However I have questioned the medical personnel. None can throw light."

This sleeping bag leaves me no room to Shrug.

"Maybe he asked somebody to take them to the Train for me."

"The Senator says nobody approached them before the alarm sounded."

This reminds me of something. "How did Junior get separated from them?"

Dr. Patel clears his throat.

"Some minutes after you left the young man expressed a wish to relieve himself. Dalrymple showed him to the nearest washroom and returned to the Senator, saying the nephew would catch up with them. He had not done so when the alarm sounded. Dalrymple insisted they should go to the Immunisation Bay, saying the young man would also find his way there. We have not yet been able to talk to Mr. Gassett-Low Junior. Now can you suggest—"

There is a tap at one of the doors. Dr. Patel goes to answer, presently he goes out again.

I prepare to cut my way out but have Second Thoughts: if I am already considered a Suspicious Character—

Something hits the nearest door like a minor Moonquake; there is a confused roaring and banging, then the Senator falls through.

He stands for a moment Swaying, then looks all round till he catches sight of me, registers Satisfaction and slams the door shut.

"There you are, young woman! I want a word with you!"

Third Thoughts: I am Not going to lie here and be Loomed over: I insert the tip of the knife alongside the zipper and Pull.

There is a bit of resistance from the Hem at the top, then all of a sudden it gives way; the cloth splits like the rind of a melon and what with Effort and Elasticity I shoot out like the Pip.

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The Senator takes a look at the knife and backs us a step.

"I'm not impressed by tricks, my girl. I want some answers and I want them Now!" He marches half a step away, then turns and shoots out a finger. "What were you up to with my Nephew? Why was he with you when the Alarm went off?"

I say "He wasn't. I fell over him later on."

The Senator snorts. "And kicked his head by accident, I suppose!"

I say No, if I kicked him anywhere it was around the middle.

"Then how did it happen all his injuries were to the head?"

I say "Ask him!"

"Oh, yes, I'll ask him all right. I'll ask how you lured him to that place so he could be hit on the head. I don't know what tales you spun him—"

Me? Lure *Junior?*

The Senator apparently takes Flabbergast for Conscious Guilt.

"I'm on to you, young woman! You're travelling under a false identity. That shakes you, doesn't it? These hick policemen may not have caught on, but they'll react fast enough when I point it out, don't you worry."

I do not even have time to worry how I React myself because at this moment another door opens quietly and in comes a Pressure Suit with a man inside.

I mean it is the Transparent sort, the Plastic is half an inch thick and full of pipes and wires and the overall effect is to make it look a lot more important than the Man inside.

The Suit raises a transparent finger and lays it to the Transparent mask somewhere near the lips.

The Senator drops his voice. "I don't have to tell them, of course. Even if they finally work it out I think I can say I would be in a position to protect you to some extent. Provided you co-operate, of course."

Pressure Suit is making gestures to say Go on, keep him talking; it has now been joined by Dr. Patel.

I say "Co-operate how?"

The Senator looks sly.

"I'm not interested in small fry. I want the man behind this. Tell me his name and I'll use my influence on your behalf. Who is he?"

Pressure Suit is still making go-on gestures but Where do you go from here? I reply truthfully that I have no idea what he is talking about.

He steps forward and grabs me by the arms. "Oh, yes, you know, and you're going to tell me! The *name!* Say his *name*, damn you!"

I do not like being Waved in the air and am getting set to kick him on the shins when a voice behind me cries "Let her alone!"

This place is rapidly becoming a Circus, the Human Skeleton just walked in.

Actually he has Skin as well as bones and I suppose some flesh between them but I can see all his ribs of which he seems to have Extra; he is wearing short pants and a large Bandage round his head and no more, his skin is a pale milk colour, don't they have Sun-ray lamps on Cincinnatus? because this has to be Junior I suppose.

The Senator swings round to confront him, this brings Pressure Suit and Dr. Patel into his line of sight and I think I heard his Jaw drop.

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Dr. Patel hurries forward exclaiming that Mr. Gasset-Low Junior must immediately Lie Down, so I offer my vacated Cot; it seems the least I can do. The Doctor is inclined to Mourn over the damage but folds the cut bits back and persuades Junior on to it. He consents to lie down but states in a kind of creaky growl that if anyone starts Bullying little girls again he will get up and See to it; the last bit ascends suddenly to a kind of soprano. Evidently he has damaged his Larynx, I just hope it was not through being slung over my shoulder.

Pressure Suit now comes forward. Under the Suit he is in a dark green close-fitting uniform with various insignia on the sleeves; also an Embroidered Translation of these which reads CAPTAIN LUNAR POLICE.

He says "That was most interesting, Senator" in a tired voice that comes from a diaphragm on his Chest, and the Senator turns Magenta and demands to know how long he was Eavesdropped upon.

"From the time when you were talking about your influence with the local Police," says Pressure Suit, "but we'll discuss that later."

Right now I would like to discuss What this nitwitted old whatnot means by alleging that I am travelling under a false identity; but Pressure Suit says wearily "If you please" and I remember that there is an Emergency. He walks forward to look down at Junior and asks whether he is well enough to answer a few questions?

This is addressed to Dr. Patel but Junior answers for himself: "Of course I am."

Pressure Suit asks whether he knows how he came by his Injuries.

Junior answers "Yes. Of course. When the bomb went off I was just outside the entrance. It blew me across the corridor and I hit my head on the wall."

Dr. Patel and the Senator exclaim in perfect unison "Bomb? What Bomb?"

Junior looks astonished.

"It went off in that hall with all the big glass machines. Where they make disease antibodies. Surely you know about it?"

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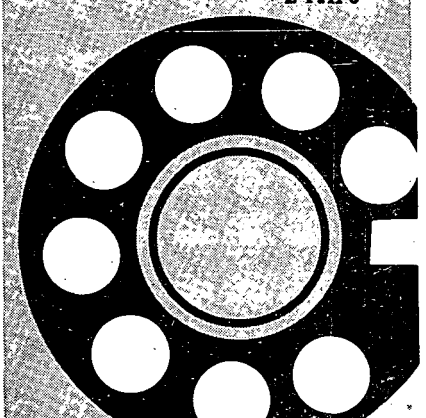

Pressure Suit asks "How did you come to be there?" and Junior goes red.

"Well . . . I was looking for the short cut to Level IV, but I got mixed up."

Pressure Suit turns to the Doctor and says "Short cut?" and Dr. Patel answers stiffly that there is a Hoist in that area for Equipment and Supplies but strictly Not to Be Used for Personnel, let alone Tourists.

"Why were you going to Level IV?" is the next question. It makes Junior's voice run up to a Squeak. "I was . . . The EF man. Our guide. I was doing an errand for him."

The Senator snorts. Pressure Suit says "But what was that?"

"He found he had this *thing* . . . I mean he suddenly realised he was carrying Miss Lee's Reading Machine. He was showing me the way to the Men's Room when it bumped his hip. He wanted to go after her, but there was my Uncle waiting and *he* was, like it said on his arm-band, Exertion Forbidden. So I offered to take it for him."

He sounds like he was confessing to a Serious Crime and the Senator is scowling as though he thinks so, too. Pressure Suit remains calm.

"When you were blown across the corridor, was it still in your posession?"

"Sure. There was a sort of pouch full of spools, too."

"Didn't you see them when you fell over him, Miss Lee?"

I reply that it was so dark I didn't even see Junior.

"Did you hear the explosion experienced by Mr. Gassett-Low?"

No, but I was round a couple of cor-

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ners and several hundred metres away.

"Did either of you notice anything whatever, during that afternoon, that seemed odd or out of place or might throw a light on subsequent events?"

I say No and so does Junior, he has gone a nasty sort of pale mud colour and it occurs to me to ask "What sort of germ was it that got loose?"

Pressure Suit says "Nothing very lethal. A minor respiratory infection." but a second later Dr. Patel reacts in a big way.

"Captain Franklin! I did not tell Miss Lee the nature of the Emergency."

Well Who needs telling? I mean what else could it be? Air supply or power? the lights are on and we are breathing. Anyway that queue of people in the Immunisation Bay were standing by a trolley just like the one where I got Immunised for going to Earth, and the itchy spot on my arm is just like the one I had afterwards, and why else would a Policeman be wearing a Pressure Suit in a room full of perfectly good Air? and if there really was a bomb in among all those glass tanks I should think it would loose enough different Germs to kill us all seven ways each.

Captain Franklin says "One virus, only. As Explosions go it was quite small and local. Now, Miss Lee, if you'll come with me we will try to find out what has happened to your Reading Machine."

Naturally this was not his Main Objective; as we glide through the corridors he wants to know my Background and what I am doing on the Moon.

The corridors are now brightly lit and the area where I found Junior is Sealed Off with screens and we have to go some way around to find one with a sort of glass-doored Airlock. Captain Franklin stops and says something on his Radio I think, I see his lips move but don't hear anything; presently another Pressure-Suited Policeman appears behind the glass holding up a transparent sack which contains my Reading Machine and pouch of books.

I am glad to see it but turns out it has not been Disinfected yet and I cannot have it till Morning.

This brings to mind something else: I look at my chrono and find it is nearly 23.00. I ask How long is Quarantine?

Captain Franklin says "Three days" and I ask where we are all going to Sleep?

He says "Oh, the lab people fixed up some of the public rooms as dormitories. I'll call the girl in charge—"

I say I do not like dormitories, couldn't I use that little cubby-hole where they stashed me away? it has a cot.

He says thoughtfully that I would probably be more comfortable there under the circumstances, speaks to someone or other and tells me it is Okay.

When he has finished I ask Does he really think it was Sabotage?

He says "You heard that boy. He was blown across the corridor all right. Traces of blood and hair on the wall."

That does not prove it was a Bomb, I reply, the Egghead guide told us that during the filtration stages of the production cycle Pressure inside the big glass tanks went up to 100 atmospheres which would make quite a Bang if one of them burst, but I suppose they can tell what happened from the Bits.

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He sighs so deeply that the Diaphragm of his suit rattles.

"Miss Lee, inside that sealed-off area are twelve employees of the Department of Health, busy destroying evidence in the name of Decontamination. A few of my boys are there too, trying to pick up glass splinters while wearing plastic gauntlets half an inch thick. . . . We'll get the picture in the end, of course."

We are now among the Rodent Habitats and he wants to know all about the time I was here before, e.g. Did anyone pass us, Did we separate at all before I left, Was any of the others carrying anything?

I say Such as a bomb? and he replies "Such as a spray can—a metal cylinder with a conical top?"

I know what they look like: No.

He says "Is Silicosol used on Excenus 23?"

I say What? and he repeats the question: I never heard of the stuff.

We are now returning and I ask something that has been Bothering me: if Junior hit the *back* of his head on the wall how did he injure his Larynx? without breaking his neck?

Captain Franklin stops and stares through his mask.

"Who says he damaged his larynx?"

I say "You could hear there was something wrong with it?"

He says "Is it any different from before?"

Come to think of it I never heard him Speak before, only mumble a bit; the Captain gives me a Look I cannot interpret.

"Star's sake, girl! Didn't you ever hear a boy when his voice is breaking, before?"

Well the short answer to that is No.

The Pop of my home planet has a restricted Age range, nearly all between 25 and 60; and at Russett they do not take pupils younger than 18 by which time the Male voice has Mended itself.

However what I actually say is "But he's two metres tall!"

Captain Franklin makes a grunting noise. "One ninety-four and a half . . . Anybody who takes a growing lad into Space wants his head examined."

I know what he means: it is a popular idea that to experience Free Fall during the spurt of growth at Puberty makes it get right out of hand. Doctors are not sure it is true.

I ask How old is Junior? and am told he is just over fourteen; I suppose that accounts for a lot.

We have now reached my Resting place. Captain Franklin points out the whereabouts of Showers and Toilets, tells me there is a picnic trolley set out in the room next to the Immunisation Bay and wishes me a Good Night.

I do not get one, however; though when I have showered and laundered my clothes—Dr. Patel gave me back my tunic, with the blood cleaned off, before I went with Captain Franklin—and compiled a sandwich I feel fit to Face the World again. But I should have asked for a blanket; that sleeping bag is Draughty now. However I must have got to sleep because I am woken in the morning by a Public Address System announcing Breakfast is Served in Room VII 23 A.

A long table has been set up and about twenty of the Five Planets people, male and female, are sitting round it. There

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is also a serving table and I collect boiled eggs and toast and coffee; as I finish I notice that Conversation which was general when I came in has now Stopped.

When I turn round they are all staring at me, even those seated with their backs to the service table. I have had plenty of people Mad at me but this is something else, a sort of stony refusal in their expressions to recognise that I am a Person.

What on Earth, or in the Moon—then I remember the Senator yesterday; have these Politicians and their wives and attachments got it into their heads that I am a Sinister Character? or do they think I had something to do with letting that Virus loose? The way it affects me, I don't know what to do with my Face; stare back or try to look as though I had not noticed them or What.

There is a sort of Break in the line; a head bobs up and then back: I see that Junior's uncle has a hand gripping his nephew's arm. . . . I decide it would be No Kindness to say Hallo to Junior. The end of the table is vacant so I take my breakfast there, and the nearest people shuffle their chairs sideways to get as far away from me as they can.

So when Tolly comes in there is a Gap. He marches over and swings a chair in beside me, says "Keep that for me" and goes to the serving table to pile up a plate or two.

The Silence has now Congealed till I wonder he can walk through it, but he sits down and says cheerfully "Miss Lee, your entrance yesterday was the most dramatic thing I've seen in years. Do tell me what led up to it."

The silence comes unstuck in a sort of Collective gasp and I start to tell him, he helps me along with questions now and then and in the end I explain Junior's part as well as my own.

Tolly says thoughtfully "Police make a nuisance of themselves much?"

I say No, just ask questions, does he suppose that explosion was really a Bomb?

He shrugs. "What's the alternative? One of those hefty great tanks going Bang on its own? Never happened before, they tell me; one or two leaks in the past but always at a joint."

I say "But *why* let off a Bomb in a place like that? What would be the Point?" I mean Terrorism as a way of getting what you want was Discredited centuries ago and anyway nobody has Demanded anything unless it has been kept from us.

"No point I can see," agrees Tolly "which doesn't mean somebody else might not see one. Tell you one thing,

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if it was sabotage and the fella isn't a complete lunatic—no reference to our hosts, of course—he won't be here now. Whole point of a Bomb is to get as far away as possible before the thing goes off."

I am very grateful to Tolly; I think perhaps the atmosphere has shifted from Hanging Judge to Suspended Judgement but maybe that is wishful thinking, anyway it is still far from Congenial; so I finish my coffee and mention that I must see how Clarence is this morning, and depart.

However I only get as far as the Supervisor lady who informs me that Clarence has not been told that I missed the Train, fortunately he was not present when I made my Entrance yesterday, it would have been very Bad for him. All the EF patients — four of them — trapped on this Level are being kept away from the rest of us to avoid Undesirable Stress: Good morning and goodbye, Miss Lee.

I go to look for Captain Franklin but am found instead by another Policeman who has my Reading Machine and books; so I make for the place where I slept—nobody seems to be using it—and try to think about my Essay.

I also try *not* to think about those faces round the Breakfast table; then there is a Bang on the door and I leap up ready to defend myself against a Mob.

However it is only Junior, in too much of a State himself to notice mine; he stumbles in and when he has collected all his legs under him Straightens up and announces in a soaring falsetto that he wishes to Thank me for saving his life.

I am Cross at having been frightened and tell him Not to be silly, I did No such thing.

His face firms up somehow and he says "But you did. Dr. Patel told me so."

I say "But that Virus was quite mild and you'd have been found anyway in an hour or so."

Junior shakes his head. "It's quite mild if you only breathe it in. But I had cuts from the glass and my shirt was soaked in Virus suspension, so it got into my blood, and that's dangerous. In another hour or two it would have got to my brain. And nobody was looking for me because Mr. Dalrymple told them I was up on Level IV; I could have died of respiratory paralysis if I hadn't been treated when I was."

Oh.

Junior says if there is ever anything he can do for me . . .

I am about to say Thanks I will bear it in mind when it occurs to me that I do want something; I tell him All obligations will be cancelled if he can find out what made his Uncle the Senator think I was Masquerading as Me.

Junior goes red and white by turns.

Then he says from the bottom of his chest that he knows the answer, his Uncle told him to prove that I ought Not to be had anything to do with: but he does not care what his Uncle says and anyway I ought to have a chance to Explain.

What made his Uncle suspicious is my Passport saying I was born on Excenus 23.

When I swooned (sic) the Director went through my pockets and read my Passport aloud to his Secretary and the

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Senator heard; later he looked up Excenus 23 in the Gazette of Habitable Worlds which he always carries; this says Excenus 23 Sole industry Mining Areopagite, av. Pop 3,200, 99% Male: av. period of res. 1 year.

Junior's Uncle says Nobody ever got born on a planet like that, no Women except—not the sort who have families, therefore QED my passport is a Fake, presumably I picked an Obscure world without knowing anything about it.

Well what a—Here I remember Junior is an Adolescent and should be let down lightly over his Uncle's Unintelligence.

So I reply calmly "Well, the Gazette is nearly right, I suppose. But even a Mining planet can't be run with Miners and nobody else. There have to be people to buy the ore and record claims and sell food and equipment and Booze, and doctor them and so on. Not very many, but some. And the ones who are not Has-beens tend to be Up-and-coming young men on First Assignment with their wives along, and sometimes they do not wait to get home before having Kids, so I personally know at least seven people got born on Excenus 23 not counting me."

A voice behind us says "Forty-one according to Central Register, since the Planet was opened up. You can tell the Senator that if there is anything wrong with Miss Lee's identification it's buried a lot too deep to be spotted by amateurs. I had it checked first thing."

Junior is Blushing violently and to change the subject I enquire whether Captain Franklin has found out whether the explosion was caused by a Bomb or not—? then interrupt myself to exclaim "But it wasn't! No smell!"

Junior Begs my Pardon and I reply that All explosives have By-products that smell, but when I fell over him within Ten minutes of the Alarm I did not smell anything at all, hence there was no Bomb.

He says blankly "But that great thick tank couldn't have burst all by itself."

My Memory has got into high gear and I say Maybe *not* by itself, there is stuff you can buy that you paint on and it re-arranges the Molecules of glass into a smaller space and kind of works its way through the Layers, when enough Molecules have been re-arranged the glass goes all to pieces or if it is under pressure you get a Bang.

Junior says "Did you say you can *buy* this stuff?"

I say "Uh-huh. Not for Sabotage; it is used when you want to spray a large area. Like the time some of Dad's imported seed potatoes turned out to have an Imported disease, Sector Agricultural sent him some big glass bulbs half full of Fluid pressurised at about 20 atmospheres. He painted them with this Gunk and hung them from the main weathermast and about two hours later they went *poof!* and the liquid turned into Aerosol and was blown over everything right to the edge of the Weatherlid."

Captain Franklin says in a tired way "You don't happen to know the name of this 'gunk,' Miss Lee?"

I say it began Very-something but I forget the rest.

He fumbles a little booklet out of a pouch and spreads it open.

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"Mm . . . You disappoint me, Miss Lee."

Junior says belligerently "Why?"

"She told me she'd never heard of Silicosol. Now any farmer's daughter on Earth knows that stuff. Sold in spray cans and acts as Miss Lee just described. I forgot that spray cans are not shipped to the Outer Planets—too many freighters in that volume have unpressurised holds. And now I see here in the small print that when the stuff is sold in ordinary cans they market it as Verracass. Another good clue gone to vacuum. . . . And now, Mr. Gassett-Low, I believe your Uncle is looking for you; and I want a few words with Miss Lee."

The Words he wants are in fact quite numerous and all about Clarence and the only ones I have in answer are I Don't Know. Such as where he was born, I know it was a farm in a valley with a stream at the bottom but I Don't Know which planet. Clarence was sent away to school at 14 and ran away to Space three years later. His passport was issued on Excenus 23 and says he has been an Effective Resident there for three years which is longer than most Miners but not so long as some.

Political Views? he once said The good thing about Excenus 23 is that it has no Politicians.

And what happened during the thirty or forty years between leaving home and getting to Excenus 23? I just Don't Know.

Captain Franklin says "And how did he seem when you met him yesterday morning? Enjoying life? Happy to meet an old friend?"

Oh, Stars.

I reply that he seemed a bit quiet on the whole.

Captain Franklin tells me that according to Clarence's Supervisor he was Delighted to know that I intended to visit him; but next morning he was plainly disturbed but refused to say Why.

I suggest that he might have been having Second Thoughts about entertaining old friends in an Environment where he got supervised to that extent.

Inside all the plastic I see Captain Franklin nod.

"Not easy, being an EF. The whole place revolves round them but they've no privacy. Those arm-bands mark them as second-class citizens in some respects. Can't do without them, though—it's been tried. Some healthy half-wit yells to an EF for help with an awkward or heavy job and unless the EF is extra sensible and strong-willed he's apt to end crash-frozen, with a thirty-percent chance that when his new heart is ready he won't revive.

"Of course the worst anybody will be to 'em is over-sympathetic, and most EFs take it as it's meant, but you get the odd one who can't adjust. . . . Your friend Dalrymple is thought to have settled down quite well. He didn't give you any idea what was troubling him?"

I say I am damn certain he was *not* wondering How to get rid of me so as to go and spray Silicosol on an Antibody tank, if he meant to do that he would have called the Royal Cynthia and told me Not to come.

This seems a good moment to mention Tolly's theory that the Perpetrator if any would have got well away from

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Labsville; but the Captain waves it away.

"Sure, sure, he told me that. Sounds good but doesn't stand up. This was an inside job."

I say Why? Come to that does he know for sure it was Sabotage?

I guess he is getting Tired of this question but he does answer it.

"Miss Lee, those tanks get checked. Five days ago that one was pumped up to 150 atmospheres for 12 hours. Yesterday it blew at 85. Then there's the Silicosol. They use it right here. Stores on this Level have a couple of cases. There's a full can unaccounted for. . . . Best guess is that to get through glass that thick'd take about twenty hours, so it must have been sprayed the night before."

I say Inside or Outside job, why would anybody want to blow up an Antibody producer, he must have been Mad.

Captain Franklin pulls a face. "One of those types who think they're appointed to administer the Wrath of God? We'd have heard from him by now. Then, only one in 20 of those tanks was in the high-pressure phase of the cycle — four of them, to be exact, and one was filtering off the antibodies, so blowing it wouldn't have made nearly so much fuss. Of the other three at high pressure, two were Culturing something pretty nasty. He picked the one with a mild respiratory Bug in it. Assuming he knew—and if he knew which tanks were Pressurised he knew what was in them, it's all on the same schedule—it doesn't seem like the Wrath of God to me."

I say I suppose the best hope of tracing the culprit is to find the Silicosol can, though I suppose he will hardly leave Fingerprints.

He turns with a Gleam in his eye I can see through his faceplate. "Oh, we've found it. Complete with prints. In a locker personalised to your friend Dalrymple. Some of the prints are his. Just at the moment the Heart Foundation's Supervisor is defending him against all comers, but he's going to have a chance to explain it all to me, quite soon."

It is not comfortable wondering whether Clarence can possibly be a quite different sort of person from the one I imagined and I am almost glad when I get paged by the PA system to go to room So-and-so at my earliest convenience.

Here I find all the rest of the Five Planets lot and we are all put through a sort of Computerized Interrogation about the day before, I suspect this is Makework to keep us out of everybody's hair. I do my best but if the Answers have any significance the Computer is not telling; it goes on except for a Sandwich lunch until 16.00.

I am now in a mood to do some work on my Essay so I am not too pleased when Junior who has been sitting on the floor just outside jumps up as I am leaving and says he has to Talk to me. However all the Books say one must be Patient with Adolescents so I wait till he touches ground again and suggest he walk me to my Cubbyhole and tell me what is Eating him on the way.

He says What is Eating him is being under Suspicion. The Five Planets party have got it into their heads that we conspired to be Up to Something yesterday

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and that it has something to do with their Imprisonment now, and whatever his Uncle or Tolly or the Police say they will go on thinking that until the Culprit is identified.

I agree this is Tough on him; he says wistfully "Doesn't it bother you at all?"

Well Yes, a bit, but I needn't have anything to do with them; anyway I don't see what can be Done; does he?

He takes a deep breath and says "I think we ought to try to find the Real Culprit ourselves."

Because of Tact to Adolescents I do not say he is Nuts, I just say "What could we do that the Police aren't doing already?"

Junior says "We can talk to the others. Informally. The Culprit might give himself away."

"Don't be silly," I reply, and I do not care if this is Tactful or not, "your party just happened to be visiting the place when the Tank blew up, why should any of them have anything to Give away? The real culprit is probably on another Level if not in Lunarburg by now."

Junior stops and anchors himself to an Incom box so as to Gesture more convincingly.

"Why should it be just Coincidence that the Sabotage happened when we were visiting Labsville? What it's done is to strand eleven of the Delegates here, while the conference in Lunarburg goes on. Today and tomorrow there'll be votes on four of the most important issues on the whole Agenda. And if you think Politicians would not try to strand Opponents where they can't cast their votes, you don't know what this Conference has been like. There have been enough Plots to sicken Machiavelli."

I never heard of Machiavelli until about six weeks ago so I am Impressed. I ask What Plots? and Junior hesitates.

"Well, my Uncle says a lot of it is ordinary Political Horse-trading—you know, swapping favours and support — only more open than usual because they are away from Home. He says on most planets you pretty well have to stay within the Rules because so many people are checking on you, but Off Planet the checks are mostly Off too and you can get away with a lot more. I mean the Lunar Police aren't going to be concerned about bribery, for instance, if it involves affairs on another planet. . . . And the things that are illegal even here—like threats, for instance, he is sure one delegate's wife was Threatened and he changed his vote because of it; and one delegate from Lamartine made a fool of himself in open session and my Uncle says he's sure he was doped. . . . well, there's no real proof . . . but that was why Uncle wouldn't let me go and see the Rats on my own, he said he wouldn't risk anyone trying to put pressure on him through me. . . . " He goes red again.

I say Could the Sabotage have been a Plot to stop his Uncle voting?

Junior kicks his feet about and says "Well, no . . . *He* thought so, at first. But it's pretty well known how all the eleven who got stranded here would have voted, and they just about cancel out on all four issues—five one way, six the other. And you must have a Majority of at least five to carry a motion."

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I say What was the point of stranding this party if their Votes cancel out? Junior takes a deep breath and starts again.

"I think it was done to strand Mr. Tollinder. He was due to speak tomorrow about the Linder Valley, on Discus. He's the leading Conservationist and the best speaker in the whole Conference and my Uncle says his speech would probably be good for twenty votes at least and that could cost Lamartine the motion."

I say What is the Linder Valley, if it is on Discus how does it affect Lamartine?

Junior tell me, at length. Shortened it goes like this:

Mining on Discus is nearly all in one area so rich in minerals it supplies the whole planet, however some of the Mining Companies took out Concessions on other areas a long time ago, just in case. These have never been used. However again, one of the Companies swapped the Linder Valley concession for some machinery from Lamartine, a lot of interplanetary trading is like that because of Problems with Exchange.

But since the Concession was issued the Linder Valley has become heavily farmed and is also a Holiday area and the Inhabitants are claiming the Concession has lapsed; they have offered to pay off the cost of the machinery in Produce or something instead.

Discan law is not clear about the duration of unused Concessions so the Issue was brought to this Conference, and if Lamartine can get it tied in with enough deals so the Discan Gov will lose something important by not Ratifying the final Vote they might get what they want. If they win the Vote, that is.

I ask whether Junior has passed this on to Captain Franklin and he chokes.

"Yes, I did. He said Mr. Tollinder is the one Delegate stranded here who *hasn't* claimed the Sabotage was aimed at him personally and it would be a pity to spoil a Record like that."

I say all the same no doubt he will bear it in mind. And I think any scheme for talking to the Five Planets people is going to fall down because whoever fixed the Sabotage would have taken care Not to get caught himself.

Junior says he doesn't think so, Whoever did it would have wanted to make sure Tolly was on Level VII when the tank exploded and he couldn't do that from Lunarburg or even from anywhere else in Labsville.

Seems to me the person to talk to is Tolly, Junior says He has but Tolly says he was down on this Level because of an appointment to discuss Research funded by Discus and that was arranged several days ago.

Junior sticks to his opinion that the Culprit would have come, or sent a Representative, in case the appointment was changed or ended early, to try to keep Tolly on this level; I see he has a Point. But I do not think Talking to people will be any good because they will not Talk back. To change the subject I ask If this conference is such a Snake Pit why did his Uncle bring him along?

Now I gather I have been Tactless again because Junior does his best to tie his legs in a knot.

"Well, he . . . my Uncle said it was a Historic occasion. . . . " I would be willing to let it go at that but he goes

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on "Actually he put me down as his Secretary and gets an allowance for me, a lot more than the cost of the trip. . . . Look, he really is pretty honest, but he said Somebody was going to pick up a handful of credits for this jaunt and it might as well be him. . . . And he didn't know what it would be like."

It takes me nearly half an hour to Soothe him and I have just started to work on my Essay when that damn PA system requests All and sundry to come to good old VII C 23 for an early Supper.

When we get there turns out Captain Franklin is making a Speech first.

He uses a lot of Words but put briefly it seems the Lunar Gov has heard Rumours that the Sabotage at Labsville was motivated by a desire to Interfere with voting at the Five Planets Conference, an Abuse of Hospitality and the Democratic Process that must not be allowed. Therefore the Gov has persuaded the Conference to bend its rules enough for the Delegates now in Labsville to participate in tomorrow's meeting via life-size two-way Stereo, not just to watch but to Speak and Vote. The Equipment will be set up in this room at 22.30 tonight so please go to bed early. Meals tomorrow will be in the Waiting Room next door, Thank you for your Attention, Good evening.

Well Good for the Lunar Gov in my opinion but the Delegates look Taken Aback rather than delighted. Junior who is in his Uncle's custody on the far side of the room starts giving me Speaking looks but I have seen enough of him for the moment. Supper is the Takeaway sort so I pick mine up and scram. Outside the door I run into Captain Franklin and ask whether he has been able to talk to Clarence yet?

Inside the mask I see his head go slowly from side to side.

"Asking awkward questions of EF subjects is by way of being a last resort, Miss Lee. I'll talk to him if I must."

I say Anyway if this theory of interfering with Voting has got anything to it there is no reason why Clarence should be involved.

Even through the plastic I can see he looks surprised.

"Dear me," he says, "so you really didn't know."

Know *what*, forgodsake?

"That your friend Dalrymple comes from Discus. It's on his medical record. Even the Supervisor admits that when he gets excited he has a Discan accent you could cut with a knife. . . . Good night, Miss Lee."

I don't care, Clarence did not spray Silicosol on that tank, he is not such a fool as to leave the can in his own personal locker if he had.

All the same I no longer feel like working and if I go to the cubbyhole Junior will come and talk to me again; there is a stereo show laid on after supper so I go and pretend to watch, Nobody pays much attention to me which is a Relief, maybe Tolly has been having a few words with some of them.

At 22.30, half a dozen men arrive with crates of Equipment, the Drama has just finished so we all rise to go.

While Not watching the Drama I have thought of something: Captain Franklin has a lot on his mind and this is a point he may have overlooked.

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At 22.45 I return to the Waiting Room full of smiles and apologies, I was using my Styler here earlier and now I cannot find it anywhere, I think perhaps . . .

Two Great Big Men take time off to help me find it and after a couple of minutes one of them produces it Triumphantly from the side of the chair where I put it just before leaving. I spread more Smiles around apologise a few more times and Go.

Twenty minutes later I return, More apologies but one of the Lady Delegates has to take an antiallergen pill and can't find them *anywhere* and I thought perhaps. . . . They do not turn up even when two other men take a hand, after we have looked *everywhere* I start looking again with enough Feminine Incompetence to make you sick; the Foreman calls my Helpers back on the job in a marked manner but nobody actually asks me to Leave, they seem to have decided that if they ignore me I will eventually Go Away.

So they are not looking when I slide the door open with a last flutter of Oh Dear Where Can It Be, then slide it Shut again and drop behind a convenient couch and lie still.

Half an hour later they have finished and Depart and What a waste, they do not even lock the Door; I get up and stretch and make for a more central hiding place, behind the solitary chair which has a cloth cover right down to the ground; I settle down as comfortably as I can.

I have had Worse waits, like the time Dad was in Hospital and I did not know whether he would Recover or not. But at least I did know Something would happen in the end, whereas this Foretaste of Eternity is not guaranteed to produce anything whatever except Cramp. In fact as Time drags on I get surer and surer I am making a fool of myself; until after about 100 minutes by my chrono something finally starts to occur.

The door slides open.

There is a dim light outside in the corridor and it casts a pale Parallelogram on the carpet. Then this is obscured, first by a human Outline and then by the Door being shut. A flashlight beam starts feeling its way around.

It flickers either side of my hiding place, then slides across it and Stays: I can see the light through the fabric; then I hear the sound of Breathing getting closer and the Light intensifies.

Then mercifully there is the sound of Contact as the person stumbles over a small table, and the light shoots away. I crawl very fast out from behind the chair and make for a free-standing bookcase about three metres away.

From further noises I conclude that the Intruder has settled down behind my former Refuge. I have a damned good idea who it is but daren't call out to him in case the next part of the Programme chooses that moment to begin. It suddenly occurs to me to wonder what the Hell shall I do if the next person to come along is Clarence after all—?

I chew this thought for about twenty minutes and then there is a Repeat: Parallelogram, Silhouette, Obscuration and another Flashlight, a good deal more powerful than the first. It slides over the carpet and touches my Bookcase, but fortunately this Intruder is not looking for a hiding place; the light sweeps on

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to the mass of stereo equipment at the other end of the room.

It is all perfectly silent; I suddenly realise I cannot even hear Junior's breathing any more; I wonder how long he can go on holding his Breath.

Answer: Too long. The flashlight takes its time over the Stereo stuff; just as the Source starts to move towards it there is a sort of Rasping noise as Junior's lungs insist on their right to new Air. The beam swings towards his chair: I scramble up, there is a Bumping noise and I yell loudly and Junior's own torch lashes around throwing shadows all over the place and then the Lights come on and there is Captain Franklin's Pressure Suit in the doorway.

With Captain Franklin inside it of course.

Junior is doing a slow descent from Mid Air. Low G has advantages, he and the new Arrival have collided with each other and the furniture but have done little if any damage, which is a Good Thing because to my total astonishment the said Arrival is Tolly.

He is Astonished too and maybe because of Political training he starts to talk first.

"*Junior?* and Lizzie Lee? Mygod. Do you mean to say that my idiot colleagues were right all the time? You two really are conspiring to Sabotage—"

I say "Hold it!"

"Everybody hold it," says Captain Franklin irritably. "You. Mr. Tollinder. How do you come to be here?"

Tolly blinks.

"Well—I followed Junior. Must have been him, I suppose; at the time I didn't know who it was. Just woke up, about ten minutes ago, and heard someone moving around in the men's dormitory. When he went out it wasn't in the direction of the washroom but through the door nearest here. Well, this equipment is important, especially to me, and we all know there's a saboteur around. I came here, just in case. And—"

"Now you, Miss Lee," says Captain Franklin even more crossly.

I say "I didn't think the equipment ought to be left unguarded. So I hid in here. Junior must have had the same idea, because he came in about twenty minutes ago. I didn't tell him I was here, because—"

Tolly says "Talk about thin stories—"

Captain Franklin says wearily "Maybe. All the same, it happens to be true. The place has been under surveillance. We were hoping to catch the saboteur ourselves."

"Well," says Tolly blankly, and then again "Well . . . I'm sorry."

"Not half so sorry as I am," says Captain Franklin.

"Yes . . . I see. A neat little trap and we all sprang it, one after another. I apologise, Captain. And to you, Lizzie, and you, Junior . . . I really don't know what more I can do."

"You can tell me a little more about this person who sneaked out of the dormitory," says Captain Franklin. "I take it you saw him silhouetted against the corridor light when he went out."

Tolly seems taken aback. "Oh, yes, of course. Average sort of build. Nothing outstanding about him."

"Well,sir, that eliminates several of your party; including young Mr. Gassett-Low here. Now would you say—"

I don't give a damn What Tolly would say. I am sick to death of the whole

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thing and propose to Mind My Own Business in future. The only thing I do give a damn about is getting to bed, and nobody else gives a damn what I do; so I depart.

Next morning after Breakfast I am waylaid by Junior who has got yet another Idea, viz., that the only way the Saboteur can now prevent Tolly from making his speech would be to damage Tolly himself.

I point out that if Tolly attends the Stereo session this morning nobody will have a chance to damage him.

"Yes," says Junior, "but he isn't going to. He says he needs to shake the fidgets out of his legs, so as soon as the corridors are open he's going for a walk to try over his Speech to himself. And I think somebody ought to go along with him."

We have been told that the final checks on the Decontamination process will be over by 11.00 and the barriers will be removed then.

I tell Junior that Captain Franklin seems to me competent to manage the Police work and in future I am going to leave it all to him; I am going to my cubbyhole to work on my Essay and do not wish to be disturbed.

By Lunch-time I have got about two-thirds of it written.

At Lunch Junior sits next to me in a condition of Frustration; his Uncle insisted on his attending the morning session so he was unable to play Bodyguard. I point out that Tolly is there, plainly Undamaged, and there was not much chance of anyone Getting At Him this morning because the corridors were full of Police.

When I return to my cubbyhole Captain Franklin is there.

He says "Coming to this Conference this afternoon?"

I say No.

"Pity. All the lab staff will be there—they don't often get a chance to see themselves on stereo. Incidentally your friend Dalrymple will be attending, and his friend Fitzroy—curious that two out of the four EFs trapped on this Level should be Discan, isn't it? I fancy several questions should be answered by the end of this session. Sure you won't change your mind?"

I do change it, half a dozen times, before 14.00 when the next session is due to begin; but in the end I go.

The Immunisation Bay is now a miniature Conference Room with about 40 seats in seven rows; most of them occupied. The Stereo transmitters are at the far end beside a huge screen showing the transmission from the Conference Hall, and a smaller Monitor Screen showing what goes out from here; at the moment this is a view of the Audience. What does not show because of the way the cameras are angled is that round the walls are about 20 Pressure Suits containing Police.

The cause of this, or so I suppose, is sitting on a sort of dais in yet another Pressure Suit; the Lunar Minister for ExtraSolar Relations, who has come to give proof of the Lunar Gov's interest in the Democratic Processes of their Distinguished Visitors; I know because he tells the stereo cameras so. Our view of the Conference Hall shows a big screen just like the one here and we can see him on that as well as on the Monitor; we can also see the Audience there,

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some of whom do not know they are on Stereo and are half Asleep.

Nobody could blame them; after the Minister's remarks the first part of the afternoon is taken up with some deadly dull business left over from the Morning: I am sinking into a Stupor myself when Junior who has a seat just behind me leans forward and whispers loudly "Mr. Tollinder's Gone!"

Tolly when I last saw him was sitting on the far side of the room. There has been a surprising amount of Going and a certain amount of Coming Back, throughout. However all the Delegates are now in sight except Tolly: I am about to suggest he has probably gone to the Bathroom when a Pressure Suit standing near the Minister steps forward and says in Captain Franklin's voice "Is anything wrong?"

Junior stands up. "Yes! There is! Where's Mr. Tollinder? I *told* you he was in danger—I told you they were trying to prevent his Speech! Now he's missing! Why didn't you look after him—?

"Don't worry," says Captain Franklin, "we did. You want to know where he is? Switch to Mobile, Levinson."

I have just noticed an odd thing: the Monitor screen shows Junior and me sitting quiet and bored in our chairs; then on the big screen the Conference Hall disappears and we are looking down a long corridor at a back view of Tolly, plainly in a hurry but alive and well.

Somebody says "What the hell is he doing? He's due to speak in a quarter of an hour!"

The view is evidently being transmitted from automatic cameras near the ceiling. While we can see Tolly pull a bit of cloth from his pocket and start Doing something with it we cannot at first see what this is. Then he turns into a cross-corridor and we get a scan from in front and can see that he is twisting it into a sort of Rope.

He ties a half hitch in it and makes for an Incom box on the wall. He stands in front of this and puts the loop of cloth over his head.

Now Tolly does nothing at all for half a minute, as though he is working up to something or maybe just getting his Breath; then he flicks the switch and starts Bumping against the box, not banging it with his fist but jerking his elbows and shoulders so that they hit it and making a Panting noise.

Up to now it has all happened in dead silence but suddenly the Panting noises and Thumps start coming out of the PA speakers on the walls; still knocking himself against the Incom box Tolly gets hold of the ends of the cloth and pulls them tight; simultaneously there is a half-strangled yell from the speakers: "Help! Get the—Ahhh!"

Then a voice says politely "Can I help you? Sir?"

Suddenly there is Genuine scuffling as Tolly falls against the Incom box while trying to spin round and tear the noose off his neck simultaneously; then there is a switch to another scanner and we get a view of a Cop standing behind Tolly and two more, all of them in pressure-suits, emerging from nearby doorways so that he is Boxed in.

The first one speaks again.

"We wouldn't want you to think we don't take care of our distinguished visitors, Mr. Tollinder."

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At which point the Minister for ExtraSolar Affairs leaps to his feet and screams "My god! You're not transmitting this?"

Captain Franklin points silently to the Monitor which shows a scene of people sitting quietly or Dozing off; evidently what is going out to Lunarburg is a tape taken earlier on.

One of the Delegates' wives says plaintively "What did Mr. Tollinder do that for?"

The Captain says politely "You'll be able to ask him in a minute, ma'am."

He looks at one of the open doors and Tolly is marched in.

That must have been a Recording we saw earlier, made at least ten minutes ago. The cloth noose has been loosened but is still lying on Tolly's shoulders, his Hair is on end and his face is a yellowish colour and one corner of his mouth Twitches, he keeps rubbing at it but it won't stop.

Captain Franklin says "Nice timing, Mr. Tollinder. Just twelve minutes before your speech is due to begin."

Nobody says anything at all for about half a minute. Then before our eyes Tolly Straightens up and squares his shoulders and his colour comes back to normal. He rips the cloth off and stuffs it in his pocket and smoothes his hair with the other hand; then he walks across to the Minister and murmurs into the diaphragm of his suit.

The head inside it nods repeatedly; then I think the Minister says something to Captain Franklin over the suit radio, judging by the movement of his lips and the Captain's expression which is now one of Disgust.

Meanwhile nobody is saying anything except the speaker in the Conference Hall: I catch the words Linder Valley and suddenly realise he is a New one. Then Tolly walks back to his seat.

The next five minutes are queer because Nothing happens at all; nobody speaks to Tolly, not even the lady who wanted to know Why he did that: the Speaker on the screen is still Boring away and his audience going on being Bored.

Then three people come in through the door nearest the back: Clarence, another man in an EF armband—this one has Rodent-style teeth but looks more like a Rabbit than a Rat—and the Supervisor lady, wheeling a cart with a lot of clinical apparatus on top.

Of course she does not know what has been happening: I rise to tell her this occasion is Not suitable for men with bad hearts but a nearby cop touches me on the shoulder and tells me firmly to sit Down again.

The Speaker in the Conference Hall now announces that the next Speaker will be that well-known champion of the Conservationist cause, currently in Labsville but enabled to be present in all but Flesh by the technological kindness of the Lunar Gov: The Honourable Randolph Tollinder, Congressman, Discus.

One thing I never expected was that Tolly's speech would turn out to be just another Bore.

I mean everybody who gives a damn must know the past history of the Linder Valley by heart, so why go over it now? Then I begin to recognise the note he is sounding, which is Inevitability. There are minerals under the green grass of the valley and men need them — one

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could almost say. Mankind needs them — so how can a few farmers expect their own wishes to prevail? The Lamartine corporation have promised that when it has quite finished with what's underneath it will put the Topsoil back and let the Valley be green again. . . .

Then he starts talking about Generous Compensation; the final message is neither Loud nor Clear but has sort of seeped in: the Rape of the Linder Valley is going to happen and the Inhabitants had better lie back and try to Enjoy it.

I twist round to look at Clarence but he is just sitting there; his companion is fidgeting and looking puzzled: I don't know whether they have understood or not.

Tolly goes back to his seat amid scattered Applause.

The Moderator rises and clears his throat. "Mr. Tollinder being the last Speaker on this Motion, Delegates will now record their votes."

Here someone out of scan hands him a piece of paper. He reads it and nods.

"This is a message from the Lunar authorities. They fear that the transmission from Labsville may be interrupted before voting is complete. They ask that our colleagues stranded there be allowed to cast their votes first, rather than waiting for the turn of their particular Planet. Do I hear consent?"

Tolly has given a Galvanic jump that gets him halfway out of his seat; but if he objects he does not say so, nor does anyone else.

"Very well. Delegates in Labsville will please come forward in alphabetical order to vote on the Motion; that in the opinion of this Conference the United Minerals Consortium of Lamartine has legal title to minerals underlying the Linder Valley on Discus, and should be allowed to proceed without let or hindrance to the exploitation of the same. First delegate: the Congressman from Northland, Lamartine, the Honourable David Asante."

Mr. Asante takes his place between the scanners and records one vote For the motion.

"The Senator from Exville, Cincinnatus, the Honourable George Gasset-Low."

Junior's Uncle takes the spot, glares at Tolly and records one vote Against.

The alphabetical listing leaves Tolly last. The next eight Delegates go up and record their votes (Four in favour, four against). Then the Moderator on the screen announces the Representative from Euchre, Discus, the Honourable Randolph Tollinder.

Tolly walks between the scanners; and now there are Three of him; one on the Monitor, one on the screen within the big screen and one just Standing there. None of him looks really lifelike; his colour is all right now but his face seems to have changed its shape, Tension I suppose; and his eyes have gone back behind it and looking through holes. His triple Presence stares at nothing and says "Randolph Tollinder, Discus, casting one vote For the motion" then he goes back to being Single and walks to his seat.

The stir here is immediate; on the big screen it starts a few seconds later and the Moderator does a double take and looks sideways as though to ask if that was what Tolly really meant to say. Then there is a shout from the back of the room.

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"EF Emergency! Get a powered stretcher, quick!"

I jump up to see, but Clarence is still sitting upright; it is the little rabbity man who has keeled over.

During the next ten minutes whenever there is a Lull I can hear some other damn Delegate in the Conference Hall recording his vote; the Monitor is blank so I suppose transmission from Labsville has stopped.

I wonder whether the lady who Wanted To Know has realised Why Mr. Tollinder Did That.

I wonder whether he was just trying to cheat the people in the Linder Valley, or the Lamartine Mining Consortium as well. Maybe when he sold out to them they agreed that he did not actually have to vote For them provided he could find a good excuse not to speak or vote Against.

Or maybe having sold his vote he was trying to get out of having to deliver, by staging the Sabotage; nobody could expect him to make a Speech when he was trapped in Labsville by Quarantine. So when Long Distance Participation was organised he tried to get out of it again; Nobody could expect him to make Speeches if he had been half strangled a few minutes before.

I wonder whether Captain Franklin knew it was Tolly all along, or not till he sneaked into the room where the Transmitters were in the middle of the night.

At this point one of the cops comes and leans his diaphragm against my ear and says Clarence would like to speak with me, Elsewhere, please.

Clarence was taken away in a wheel chair while they were still getting the rabbity man connected to a surrogate Heart. I follow the cop into the corridor and then discover Junior has come too.

Clarence is in a room that looks like a Hospital but he is not in bed, just sitting in a chair and looking Severe rather than Sick; I introduce Junior and he says he is glad I have found a friend in this place since he could not Look after me himself, he did not know I had got stuck here until a few hours ago.

He then looks at us both and says "Not much fun for you kids on this trip. I'm sorry."

I say It was not his fault anyway.

He sighs, then checks it as though even too much Breathing might be bad for his Heart.

"It *was* my fault, Lizzie, in a way. I could have put a stopper on before it happened if I hadn't believed that damn fool Fitzroy. I copped him about an hour before you got here, in the Antibody factory with a can of Silicosol. He hadn't any business there and he looked as guilty as hell, so I took it away from him and read the label; but he swore he hadn't used it yet. He'd only been there a few seconds so I believed him. Actually he'd used the can the night before, and hidden it, because somebody came. He was collecting it to sneak it back into Stores. . . . I took it away and put it in my locker while I decided what to do. Didn't want to get him into trouble if I could help it, poor fish. . . ."

Junior says "Did he tell you what he was doing? And why?"

"Oh, yes. I said I'd report it at once if he didn't. . . . *He* thought the fella that put him up to it was going to herd twenty or thirty pro-Lamartine Dele-

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gates down into Level VII just before the tank was due to blow . . . Shouldn't have swallowed that one—me, I mean. *Or* Fitz, but he hasn't any brains. . . .''

I say ''Pro-*Lamartine?*''

''So they couldn't vote to mess up the Valley. Fitz used to go there as a kid. Loved the place. . . . He read some guff about Tollinder in the *Lunar Times* and wrote to him saying Carry on the good work. . . . Then some fixer came here to see him. Put him up to the sabotage. . . . When Fitz found he'd bagged Tollinder himself he damn' nearly passed out. Would have done if he hadn't been full of tranquilisers—we both were. . . . When I caught him I made him clock in for full-time therapy all day—hell, he needed it after the shock of being caught—so he couldn't tell anyone he hadn't sprayed the production unit. I thought I'd neutralised the whole scheme; when the Alarm went off it never even occurred to me that Fitz was the cause. . . .''

He sounds perfectly calm but the Supervisor arrives to say some Index or other has risen ten points and Junior and I are to Go.

We wish Clarence goodbye and start back the way we came.

I do not know what to say to Junior, he liked Tolly and admired him and Now look at him, shown up as a Phoney and made to look Silly and now turns out he played the meanest trick I ever heard of on a man with a bad Heart.

However it is Junior starts the next conversation, he wants to know Do we have to tell Captain Franklin what Clarence said?

No need, I reply, he has obviously bugged the whole Place, not just the cameras that followed Tolly around, look how he always turns up at the Psychological moment.

At this Psychological moment a cop turns up and says Captain Franklin wants to see both of us, please.

Judging by the Diagrams on the wall the Captain has taken over the office of a Xenophysiologist. I get the impression he has forgotten why he sent for us; but after a moment he fishes a Computer transcript out of a file.

''Here. Dalrymple's statement. You sign as witnesses, then we needn't bother him about it. Read it through first.''

Junior says ''So you *have* bugged every room on this Level!''

The Captain puts his gauntlets together on the desk and says ''No.'' Then he gives a kind of Shrug inside his suit. ''I just used what's there. The whole of Labsville's monitored. Audio pickups every twenty-five metres, cameras every fifty. It's because of the EFs. They wear cardiorhythmic alarms, but transmission's poor through rock walls. With the cameras, an EF who wanders off to have a heart attack in private can be located within thirty seconds. . . . Have you read that yet?''

The Transcript is quite accurate, I sign and so does Junior. Captain Franklin sticks it back in the file and says dreamily, ''We re-tuned all the cameras in the Immunisation Bay to infra-red. When you went and sprung the trap I'd have traded the pair of you for a bent milli-credit; but today was much, much better. For nearly half an hour Mr. Randolph Tollinder genuinely thought his number was up. He—''

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Junior says "Isn't it?" and the Captain gives him a look.

"Boy, you don't think anything will really happen to him, do you? A distinguished visiting statesman like him? You don't think we could ever be so crude as to bring him to court, say, for damaging Lunar property and inconveniencing Lunar citizens and wasting the time of the Lunar Police?"

Junior says blankly "Why not? You've got all the evidence—"

"Evidence of what? Faking an attack on himself? No law against that."

I say "Surely there must be one against Sabotage!"

The look Captain Franklin gives me is very, very tired.

"Miss Lee, the Silicosol was applied to that tank when Mr. Randolph Tollinder was quite certainly two hundred kilometres away."

I say "Well, he—I forget the word — did something to that little man with the rabbit teeth—"

"He *suborned* him," says Junior sternly.

"They never met. Fitzroy hasn't left Labsville in six months and Mr. Randolph Tollinder never set foot in the place till the day you all came."

"He has two aides and a secretary with him. I can give you their names—"

"I've got 'em. I even know which one came here by train, the day it was decided to send a sight-seeing group. I haven't found anyone yet who saw him with Fitzroy—"

"But surely," says Junior, "now he knows how he was fooled, surely Fitzroy himself—"

"Fitzroy," says the Captain, "is dead. Temporarily, at least. They got his heart going a couple of times but couldn't keep it up. He may come out of the freezer alive in a few months' time when his new heart is ready, or he may not. By that time Mr. Randolph Tollinder and entourage will be back on Discus. In fact they're cutting their visit short. There's a ship day after tomorrow. They've booked on that."

I say "You could stop him, couldn't you?"

"Of course. All it takes is a warrant signed by the Minister for ExtraSolar Affairs. You saw how he reacted. . . . No, Mr. Randolph Tollinder and entourage will be seen off with honours to get on with their political fence-mending back home. One thing I accomplished," says Captain Franklin broodingly, "I made the bastard record his vote while the issue was still doubtful, so that he had to deliver it the way he'd been bribed to do. That's one thing he'll find hard to explain. . . . No, what am I saying? He'll get to whoever is due to feed that report into the printers back on Discus, and get it adjusted."

"But the rest of the Delegates know!" says Junior.

"Of course. The ones who matter to him are those from Discus. They'll have favours they want from him. Tomorrow they'll all get together and trade. He's doing it right now with the bunch here; none of them will mention that funny little act with the noose, when they get back to Lunarburg. Now if the other Discans at the Conference had seen *that*—"

"Why didn't they?" says Junior angrily. "Why wasn't that transmitted with the rest?"

"Because the officer in charge of the

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transmission chickened, that's why. He said if *I* wanted to throw away my post and my pension I could do it some other way. . . . Hell, I can't blame it all on Levinson, I could have picked somebody who'd follow orders—if I put 'em in writing. . . . But keeping foreign politicians honest is not my job."

I say "But *this* one destroyed Lunar property and wasted the time of the Lunar police."

"If the Minister for ExtraSolar Affairs says to let him get away with it, who am I to argue?"

"But *why?*" says Junior. "Why does the Minister want him to get away with it?"

"Because interplanetary conferences are an important part of our tourist trade, that's why. At least he thinks they could be; but *not* if prospective conferers get to know that we had the discourtesy to show up a Distinguished Visitor before his fellow Delegates in the act of making a fool of himself. . . ."

I say "Did he really expect to get away with that?"

"Course he did. It wasn't really a bad performance. If you'd only heard it the way he intended, it probably wouldn't have occurred to you that it was a fake. . . . He had a note in his pocket asking him to come to Room VII F 39 to learn who sabotaged that Unit, before making his speech. Thought of everything. Except that we'd follow him by camera the whole way. . . . The Minister took personal charge of that tape."

I say "But you kept a copy, surely?"

"What for? To cheer my old age? Sure I kept one, but Space knows why. Maybe I'll wipe it after he's gone."

Junior is furious. "*I* witnessed everything. Nobody is going to silence *me*."

"Uh-huh. You won't get to talk to anybody, son. You're going home too."

"Who says I am?"

"Your uncle. First deal Tollinder cooked up was with him."

Junior turns clay-coloured. "But that means I'll be on the same ship with that man. I won't travel with him. I *will not*. If—if they make me I'll tell everybody on board what he did."

"Then he'll make a fool of you some way. Man's a politician. Convincing people is his trade and he's good at it. That's because he believes it himself — not the words, but the doctrine behind 'em."

"Doctrine? What do you mean?"

"*His* doctrine. What's good for Randolph Tollinder is good for Mankind."

There has been a Thought struggling at the back of my head for some minutes; now it suddenly pushes to the front and I say "It was not good for me."

They both turn and stare.

Captain Franklin says "You don't look at it in the right way, Miss Lee."

Hell, do I want to do this? It is not *my* job to keep Politicians honest either; unless it is Everybody's, maybe.

Tolly was kind to me and I liked him, and I don't suppose he *meant* Fitzroy to have a Heart Attack; he may not have *known* he was an EF when he picked him as a Tool. . . .

But there is Junior. It is very Bad for the young to see their Elders Getting Away With It and the people who ought to prevent it just Sitting back, they have to get cynical some time but it Warps you to do it too soon.

I say "Tollinder got me stuck here

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when I wanted to go back to my Hotel. He caused me to be drugged and confined and Suspected by the Police. Those were offences against me personally and I ought to be able to Sue him."

Captain Franklin gazes at me with wide-eyed wonder that turns to Hope, then back to Resignation.

"Bygod, what a thought. Sue him, in the Piepowder Court. The *Lunar Times* would print *that*. Straight Court reporting, the Minister couldn't do a thing. And once it's in print. . . ." He stops and sighs. "A lovely thought, Miss Lee, but it can't be done. What the *Handbook* doesn't tell you is that before the Bailiffs move they calculate the possible cost to the plaintiff if the case is lost; replacement tickets for defendant and witnesses, hotel bills, legal costs . . . on this case it could come to Cr.10,000 and they wouldn't move a step till you'd made Cr. 10,000 available in escrow."

I say My father has Cr.500,000 in the Bank of Terra and I am empowered to draw up to Half of it.

Junior gives a sort of whistling gasp; Captain Franklin allows his Jaw to drop slowly until it touches his collar bone, then snaps it shut and reaches for the communicator.

"Well, it's a nice dream, let's stay with it for a little. . . . Annie? Get me whoever is Consul for Excenus 23."

I doubt whether there is such a person but Captain Franklin says Every planet with Pop more than 2 has a Consul on the Moon, turns out he is right.

What's more the Consul is an Acquaintance, the fluffy lady from the Royal Cynthia Hotel.

She is surprised I am surprised and says Travel Agents always send Excenan citizens to her for that reason, she is Consul for half a dozen Planets too; she then listens to a Summary of the situation, writes down the Relevant details including the number of Dad's bank account, and rings off after telling me to get a good night's rest.

There is a good deal to arrange first, but in the end I do.

Next morning is distinguished by an air of Total Unreality; Quarantine does not end till after Lunch and the morning is spent on an elaborate personal Decontamination; Hair, Skin, Clothes, also Baggage which was collected from our respective Hotels and delivered here the day after the Emergency started. I don't believe any of it is really happening nor do I believe it is ever going to Stop.

However I do eventually find myself on the Train, Junior is sitting two rows forward with his Uncle and Tolly four rows behind me but I have no urge to speak to either; or to read, watch stereo, listen to music or even Think; but at very long last the journey wends to a conclusion, the train stops and we all pile Out of it.

Reality now appears in the shapes of three men in crimson long-johns with a gold stripe down the sides, and flat circular black hats; the Leader who is carrying a clip-board makes straight for me and I sign a post-dated escrow cheque for Cr.10,000. He turns and signals and one of the others approaches Tolly and hands him a summons to appear in the Piepowder Court, the third Bailiff is busy subpoenaing Witnesses.

Proceedings are interrupted by a

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Scream I have heard before; the Minister for ExtraSolar Affairs has come to greet the returning Delegates and one of the Bailiffs takes the opportunity to Subpoena him.

Tolly has his back to me and I do not get to hear or see his reaction because the Minister's is to charge straight at me with the Subpoena in his hand.

"You. Young woman. Miss Lee. You can't do this. It's a misuse of the Court. Plain malice. I won't permit it. Intolerable! You must withdraw it at once. Do you hear me? At once!"

A very small very dry very ancient voice makes its way through the Uproar.

"I must ask that all communications to my Client be made through me."

The Lawyer whom the Excenan Consul found for me retired from active practice about 40 years ago and the Piepowder Court has only been in existence for 2, but he proceeds to quote verbatim from the Act establishing it until the Minister exclaims "Not here! Let's go somewhere private, for heaven's sake!"

Where we end is some sort of Office not far away. The Minister has given up Blustering and demands to see my Passport.

Having got it he says in disbelieving accents "You are nineteen standard years old?"

The Lawyer says "Legally adult. Old enough to bring the action in her own name."

"But legally in tutelage as a Student." The Minister picks up the communicator and demands to be connected with Professor M'Clare.

I don't know where on Earth they eventually find him except in a Time Zone where it is evidently Night, M'Clare is in a dressing gown and his hair is ruffled.

The Minister apologises for disturbing him at this hour, but a young woman who is apparently his Ward is insisting on a course of Conduct which will embarrass a Distinguished Guest of the Lunar Gov, will he please tell me to Stop.

M'Clare says "May I speak to her, please?"

The Minister says he would just like a minute to Explain—I stick my head under his arm close to the visual pickup and say Hallo.

There is that three seconds of No reaction you are warned about but it is still Disconcerting; then he says "Hallo, Lizzie. Who are you persecuting, and why?"

I tell him. . . . At the end is the Three seconds' silence, then M'Clare's expression changes from Listening to Thought.

He says "Lizzie, are you enjoying this?"

I say it is very nearly the nastiest job I ever undertook in my entire Life.

He says "As your guardian I can legally forbid you to continue."

I say "Damn it, I am not looking for an Out! It is something that must be done."

He says "Well, your methods seem ingenious. I'm not sure how fool-proof they are. I'll give it some thought. When does this case come on?"

I say Next morning at 09.00; Tolly is not planning to leave till the following day so there is no point in having a session tonight.

He says "Yes. Right. Try to get back

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before the Semester starts, won't you? I'll see you then."

At this point the Minister seizes the communicator, demanding that M'Clare act like a Responsible Guardian and make me Stop, but he is too late, M'Clare has switched off.

It has been arranged that I am to sleep at the Lawyer's Hotel for convenience in conferring with him. We confer. The Lawyer is not happy about such an important part of the Material evidence having been entrusted to so young a person.

I say Junior is very Reliable for his age.

"Yes. Quite. But he will have to be very careful with his words in order to convey the right impression without committing perjury, or involving this policeman whom you say you have undertaken to protect."

What Junior has charge of is a Camera, fifth-hand, purchased by me from Captain Franklin's son and sold to Junior for Cr.0.1 so that he can truthfully say he Owns the thing. He can also truthfully say he took the Tape contained; it was his finger on the button. The lens was aimed at a screen showing the session in the Immunisation Bay, including closeups of the screen with Tolly's performance as a Self Strangler and his arrival between two Policemen; the tape has been intercut with scenes Recorded but not transmitted to Lunarburg, such as the row of pressure-suited Policemen round the walls, so as to look as though he took it while the Session was on.

Tolly may Suspect its origin but it will do him no good to say This is not amateur stereo but an illicit copy of the official Police tape; Captain Franklin seems fairly sure he can get away with it.

I also have a tape of Clarence's Remarks played on to the Notes section of my Reading Machine.

Finally the Lawyer is satisfied that he has covered all the arrangements and allows me to go to Bed.

The Piepowder Court is held in an ordinary Lunar room, cut square not drainpipe, with benches for Spectators and Press. There are chairs at the far end for the Principals and the Lawyer and I make our way to them. I see Junior on the front bench looking Tense but Determined and the Senator next to him.

Court should open in five minutes but does not.

Presently the Lawyer whispers to me "The Minister should be here. He can't afford to be seen neglecting his obligations as a citizen. I don't like this."

However after about ten minutes a door slides open behind the Judge's chair and In comes a man in grey with purple braid, followed by the Minister and Tolly and a fat man with Lawyer written all over him, the last three go to the chairs opposite ours and sit down.

A red-and-gold Bailiff steps up and announces The court is now in session to hear and judge the complaint of Miss L. Lee, Excenus 23, against Randolph Tollinder, Discus, both being Transients.

Tolly's Lawyer immediately stands up.

"Your Honour, this case arises out of the recent Emergency at Labsville, in which the plaintiff and my Client were both involved. *Innocently* in-

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volved. The plaintiff claims that she suffered inconvenience and unpleasantness and my client concedes this. She has made the further claim that this was caused by the action of my client, and this he emphatically denies. However in view of the weighty and urgent affairs that have brought him to Luna he does not wish to expend his own time, or take up the time of this Court, by arguing the matter. He has therefore paid into Court the very considerable sum of Cr.20,000 to cover all possible claims on Miss Lee's behalf. May I say, Your Honour, that the time involved was only three days and the inconveniences suffered by the young lady were not of a nature to cause lasting harm. Therefore this is a generous settlement. In return, we ask that the young lady be enjoined against making public statements which might be injurious to my client's reputation."

My Lawyer says softly "Damn. I was afraid of this."

I whisper "I don't have to accept."

"Oh yes you do," he whispers back. "This court was designed for the financial settlement of personal grievances, not for the exposure of political corruption. If you try to pursue this further the Judge will rule you out of order and have you restrained. I hoped Tollinder would not be able to get hold of a sufficient sum in the time available, but . . . " He shrugs.

Two minutes later he has accepted a draft from Tolly's lawyer on my behalf.

Tolly has bounded back on top of the World and is looking More than Life Size; his voice rings out from the far side of the Court: "M'dear fella, I don't grudge it to her, she really did have a nasty time and no doubt she needs the Money—" He and the Minister and his Lawyer are Processing towards the door; it opens just ahead of them and there is a Bailiff in gold and scarlet and black standing just beyond.

He hands Tolly a paper and begins "Randolph Tollinder, you are summoned to appear at the Piepowder Court today at the hour of 15.00 to answer the complaint of the New League of Delos, to wit, that you did unlawfully cause one Derek Fitzroy to be procured and suborned to damage and destroy one Antibody Production Unit at Labsville, Luna, said Unit being the lawful property of the New League of Delos. Plaintiff asks for Actual Punitive and Exemplary damages in the sum of Cr.500,000."

The Judge has leaped to his feet as suddenly as a Tourist just off the Lift and is hanging on to the edge of the Table to anchor himself while crying "What? What? What?" One of the Bailiffs is approaching me, my Lawyer is murmuring "Beautiful. Beautiful!" Junior has been stopped by another Bailiff and looks totally Bewildered, What the hell is the New League of Delos anyway?

Then I remember.

When all the Planets got together to fund Reverse Antibody Production they did not want to call themselves Association of 59 Planets or whatever; about 4000 years ago Delos was a Sacred Place where sickness and death were Not Allowed and there was a League of it then, so this was the name they picked.

A tall dark distinguished man who is Lawyer for the New League of Delos

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steps forward and tells the Judge that The Local Chief of Police at Labsville has been Subpoenaed and should be here by 15.00; it is understood that he has handed certain records to the Minister for ExtraSolar Affairs (here the Bailiff hands a subpoena to the Minister who look fit to Combust) so as the Defendant has presumably got his Case together already there seems no reason for Delay after the Policeman arrives.

The Senator does not object when it is suggested that Junior, who is now looking Totally Confused, should wait with me at the Lawyer's Hotel till the next hearing starts. On the way he explains matters to Junior in a long dry quiet soothing statement that reduces it all to something that happened a long Historical time ago, maybe History has its uses after all.

He says The New League of Delos has been inactive for many years since there was nothing much for it to do, but it still has Representatives and all the Political Pull it could possibly require. Junior then asks a question I have been Pondering: "How did they know what Tolly did at Labsville? Who tipped them off?"

The Lawyer coughs. "I have no information on that score."

Nor have I but I can guess: M'Clare.

This Hotel is the sort that gets the *Lunar Times* in Printout as well as Spool; Junior and I are given a stack of them and left in the Lounge. Presently I mutter to Junior that I was not just trying to get Tolly's money, anybody can have that money, I will give it Back, the point was—

Junior says, "Yes, I know. You were using the Legal Machinery available and so was he. I quite understand."

Later I ask if his Uncle was very angry at having his deal with Tolly upset. I suppose it has fallen through?

Junior puts down his paper and says earnestly, "Lizzie, my uncle doesn't like corruption. But one of his constituents who's in interstellar trade has got into trouble on Discus over Import rules and Mr. Tollinder could have been a big help to him. Uncle says he has a Duty to help his own people any way he can and the Linder Valley is none of his business—"

I say Okay, okay, I quite understand too.

Nothing else happens till Lunch, after that we go back to the Lounge and wait some more: I wonder what Tolly is doing now.

Then somebody comes in and walks straight towards us, a stocky man with nothing in particular in the way of a Face but vaguely familiar; then I realise when I saw him before it was under Glass.

Captain Franklin in fact.

Not in uniform, he travelled in tunic and trousers like anyone else but will change before the Hearing I suppose—

He stops in front of us and says "Well, it's all over. You can go home."

Junior says "What?" and I say The Hearing was not due to start for an hour yet.

The Captain says "No Hearing. Tollinder's dead."

There is sort of wordless noise from Junior at the same moment I say "How?"

"Cyanide. Pinched it from one of our labs, I suppose; just in case."

I can feel the shock right down in my

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guts but somehow I am not surprised; I could not imagine Tolly going back to Discus in disgrace and I suppose neither could he.

Captain Franklin sits down opposite Junior and me and says "There's a proverb in one of the old languages, Spanish I think—that I rather like. It translates "Take what you want and pay for it, says God." Tollinder took, all right — according to his secretary, Lamartine Minerals paid off debts of nearly Cr.1,000,000 for him—and then tried to get out of paying. You could say he's bilked his creditors one last time, or you could say he's finally met the bill; either way it was his choice. Don't let it ride you. . . . Miss Lee, you're booked on the Lift at 18.00, your Lawyer felt you wouldn't want to hang around. Mr. Gasset-Low, I believe you're going home tomorrow. You'll both be back, I expect. Everybody but a born ground-hugger goes through the Moon once in a while. If you need anything on Luna, get in touch."

I have some Tidying-up to do and I make the Lift with only fifteen minutes to spare and find a Surprising number of people seeing me off. The Lawyer shakes hands; he is going to take his fee out of the Cr.20,000 and split the rest between Clarence and Fitzroy when they are ready to leave—but the Consul for Excenus 23 kisses me and so to my surprise does Captain Franklin. (I asked the Lawyer if he was liable to lose his job for disobeying the orders of the Minister for ExtraSolar Affairs and was told that the Minister was more liable to lose his, as things turned out.) For a moment I think Junior is going to kiss me too but he loses his Nerve and just asks for my address. There are also several people from the Five Planets Conference but I am not sure whether they are Seeing me Off or just making certain I actually Go.

In the Lift, I don't feel good.

It is not that I think I have done the Wrong thing, but I wish Tolly had been a Repulsive character with eyes too close together and a Reptilian coldness of disposition, instead of somebody who took the trouble to be Nice to me when he didn't have to. Of course if Politicians do not want to be held Accountable they should stay out of the Kitchen and of course if you find one has done something—not necessarily downright Evil but Wicked or just very very Bad—you should Take Steps about it if it so happens you can, but it must be a lot easier afterwards if you could count them Inhuman instead of All too much so.

This reminds me of my Essay which in a way was the Start of the whole thing. I get it out and read it through and conclude whether Right or not it will just have to do, I cobble an Ending on to it.

Meanwhile Weight has been going up in graduated stages, am I really as heavy as this? however I am more or less used to it by the time we land.

There is Nowhere else I want to go so I return to Russett a day early.

Hardly anyone seems to be around. B has not arrived of course and neither have the rest of my class, M'Clare is still wherever he went and so are most of the other Instructors, however I learn Priority Catford is on campus so I stick

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my Essay in her pigeonhole, at least I did *one* thing I intended to.

All the same I don't know why people go on Vacations, I wish I'd stayed home.

Since I have Nothing else to do I decide to make a start on the Reading Lists for the next semester, they are on my desk and I take one over to the Library console.

There is a spool in the receiver already, Can B be here after all—? No, the label is coded to me.

My portable Reading Machine was waiting for me at the Lift Terminal and I picked it up (I gave my Lunar one to the fluffy lady to be given to a Deserving Cause) so I drop the spool in.

Title: *Mask and Truth: an Examination of Fictional Themes of the Twentieth Century in relation to Contemporary Thought and Experience* by Cecil Cudfield.

I switch to the Index and see it includes the Topics of at least eight peoples' Vacation Projects; one chapter is called "Evil Horror and Alienation" and when I skim through it there is the Argument of my Essay with a lot of Historical tie-ups I never thought of and plenty of Examples, some of them better than mine.

But if it has all been written already Why tell me to do it again? it does not make Sense.

To Hell with Education. ■

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EVOLUTION OF ENTROPIC ERROR IN CLOSED CONSERVATIVE SYSTEMS

Marc Stiegler

Some scientific findings are too important and too universal to be confined to a journal where they will be seen by just one group of specialists. These, for instance...

Ever since the successful quantization of universal error by our statistical mechanics group here at Oxford[1] Dr. Zachariah Marnel's mathematicians in the U.S. have denounced us[2]. Yet every experiment we conduct lends more support to our Theory of Error Conservation[3]. Dr. Marnel's dogmatic clinging to his own theory of entropic error has become absurd.

I am sure the basic difference between our two theories is familiar to all readers; Error Conservation states that the total error of a closed system remains constant. The theory of entropic error, on the other hand, claims that the total error of any system is constantly increasing, just as the entropy of the universe increases. Thus, according to Dr. Marnel, every time an error is neutralized (or "corrected" in the terminology of the specialists) this neutralization causes the creation of two or more new errors[4]. One could express it in this manner: Although two wrongs don't make a right, two rights do make a wrong. This, on the face of it, is absurd.

But let us settle the matter with an examination of our most recent experiments. The first experiment was an attempt to determine the factors and formulae relating different types of error. Three types of error were investigated: 1) scientific error, 2) legislative error, and 3) administrative error. The experimental design was straightforward: A government research project was analyzed in terms of a) the inaccuracies of the conclusions of the sci-

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entists, b) the injustices written into the laws based on these conclusions, and c) the misinterpretations of these laws by the officials in charge of enforcement. We chose to study these three types of error because Error Conservation applies only to closed systems. Although no real system is truly closed, all three of these groups work in vacuums divorced from reality. They approach the ideal very closely.

We discovered a linear relationship between scientific error (S) and legislative error (L):

$$L = K(S) + L_i$$

where K is the conversion coefficient and L_i is the natural error of the legislative body in the absence of scientific input. L_i varied from legislative body to legislative body; it seemed to be roughly proportional to the number of representatives in the given legislature, but we did not explore this in any depth. The conversion coefficient was found to be approximately 2.7×10^4 legislative errors/scientific error. This K was constant to within the limits of our measurement accuracy over a wide array of scientific research projects.

The administrative error (A) was a somewhat more complicated function of the scientific error:

$$A = A_o e^{GS}$$

Where A_o is the natural error of the administration in the absence of scientific input, and G is the conversion factor. Here, the conversion factor G is approximately 4.5×10^7/scientific error. As is obvious from both the function and the factor, administrative error rises much faster than legislative error as the system increases in size. We postulate the difference to be caused by the following phenomenon: Whereas a group of legislators must ultimately resolve their errors into a single unified statement, administrators are free to act independently in their misinterpretations and generate individual errors at will.

In any event, this relationship remained constant over many cycles of research-leads-to-laws-leads-to-enforcement-leads-to-new-research as the enforcement failed to give the desired results. Error was always conserved when expressed in constant units—we converted to scientific error for all comparisons. Even when research groups were broken into smaller groups or lumped into larger ones, the total error of the original bureaucracies always equalled the sum of the errors of the new bureaucracies.

One of the most striking predictions in Dr. Marnel's theory of entropic error is the existence of error-generating (i.e. "accident-prone") persons[5]. Obviously our Theory of Error Conservation leaves no place in the universe for such error-generators. In a diligent search we were able to locate three individuals with some of the theoretical characteristics of the accident-prone as described by Dr. Marnel. Unfortunately, two of them met with untimely deaths before we could contact them, and the third was hospitalized the day experimentation was to begin. So we have not yet verified or contradicted the existence of error-generators, although we are still trying.

We have, however, explored the so-called Theoretician's Dilemma[6]. This is the common superstition that when a

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theoretician enters the laboratory, everything goes wrong (i.e. if the theoretician observes an experiment, errors are made that invalidate the experiment).

Our initial results in this area were dismaying: scientific error did in fact increase when a theoretician received access to the lab. We were baffled for some time by this phenomenon. But then we noticed a curious subtlety in the effect. As the theoretician observed for longer periods of time, he caused less increase in error.

From this we deduced the existence of both potential and kinetic error. Kinetic error is directly observable, whereas potential error is "stored." Potential error must be reconverted into kinetic error to become observable.

This concept fitted our observations neatly. The theoreticians we studied worked mostly with mathematics, which made it difficult for them to commit real errors. Yet error was constantly being pumped into them by experimental results. This caused a buildup of potential error which had little chance to escape. When the theoretician observed an experiment, this potential leaked off and showed up as kinetic error in the laboratory. As the potential error was exhausted, the Theoretician's Dilemma disappeared.

There have been several articles hotly debating what happens to a theoretician's potential error when he dies. We are now filling out paperwork to acquire a theoretician with which we can experiment. In light of the large numbers of Ph.Ds currently on the welfare roles, our only fear is that the government will release more theoreticians to our research than we could hope to exterminate and analyze in a timely fashion.

It should be noted in passing that our work has many practical uses. We now see that important research should involve as few people as possible. This holds down the total error. The theoreticians for important research should always be observing extraneous experiments, so that the error they absorb from the team's real experiments can be channeled off into other fields (some groups have always had their theoreticians involved in pointless experiments, which shows the power of human intuition). And although our government has chosen to overlook the military applications, others have not. The United States, with guidance from Dr. Marnel's group, is working on a method to parachute theoreticians into enemy territory[7]. It is estimated that a single high-yield physicist (i.e. a physicist who has done voluminous work with no experimentally verifiable results—such a man would have a large potential error buildup) could incapacitate the Kremlin for a decade, if the potential error were released properly. And it is rumored that Russia is working on a technique for storing administrative potential error[8]. This would be a major strategic breakthrough; administrators are more numerous, more expendable, and easier to plant in high-security areas. Once again, the weapons of tomorrow are being developed by the superpowers of today.

But I have digressed. My main purpose here is to reply to the ridiculous accusations of Dr. Marnel. He has re-

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peatedly vilified the research which my group has done. Our experimental results consistently confirm our claims for error conservation. Other groups throughout England have verified our results. Yet Dr. Marnel has not turned his attention to the flaws of his theory. Nor has he attacked our results or our methods. Rather, he has attacked myself and my colleagues personally: he claims that our research has failed to find growth in error because we ourselves have made errors in our measurements—and that, when we add these errors in, the total error has increased at every step.

Now, my coworkers are careful, objective men, and I am appalled that a reputable scientist such as Dr. Marnel would lower himself to personal attacks when he is unable to find flaw in a rival's theory. I can only hope the scientific community will censure him as long as he continues in his ungentlemanly—and unscientific—conduct. ■

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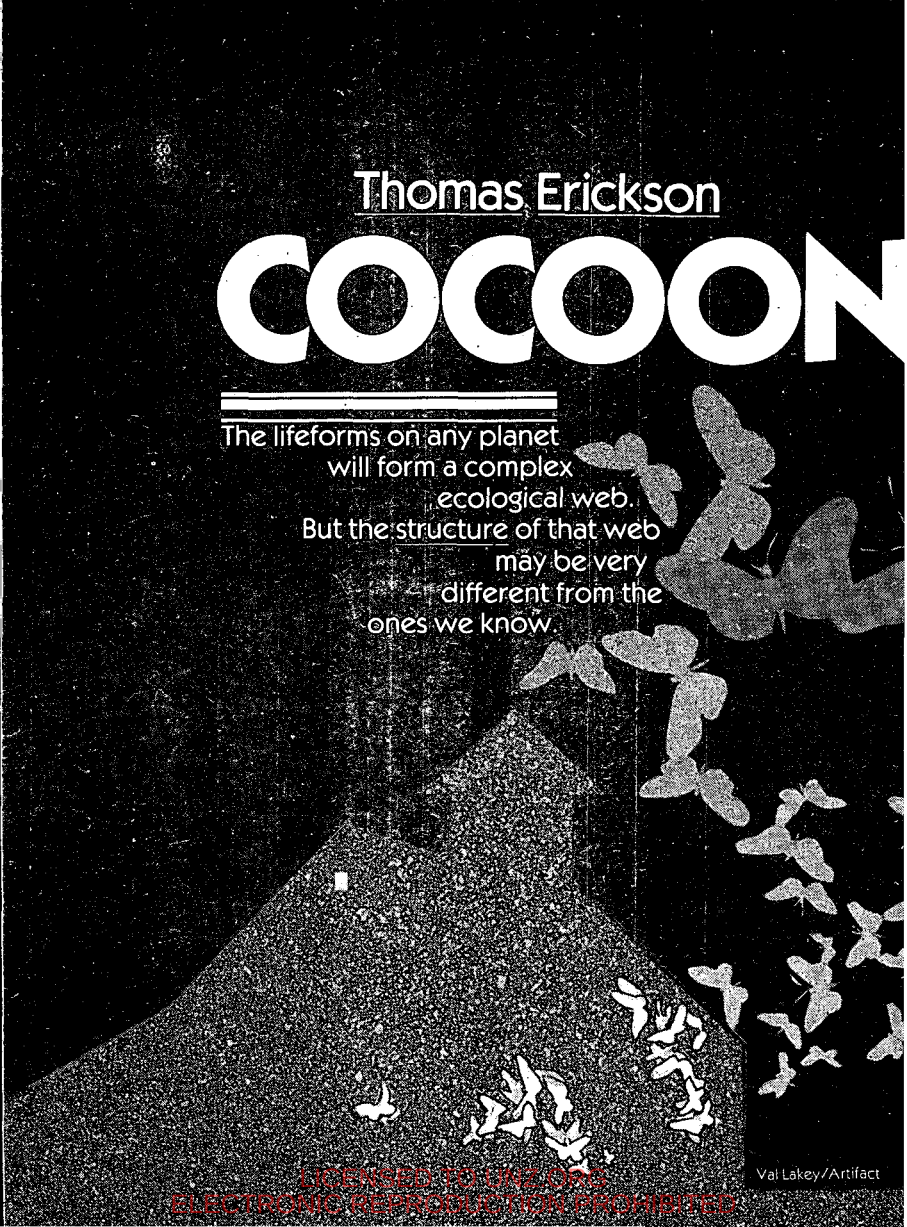
Thomas Erickson

COCOON

The lifeforms on any planet will form a complex ecological web. But the structure of that web may be very different from the ones we know.



Val Lakey/Artifact

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In the twilight the grey surface of the farm pond mirrored the sky: a maelstrom of dully flickering colors shot with darkness. For the last week the bright dancing colors of Teliat's endless day had been dimmed, and the farm withered in a twilight which should never have come. Cloaked in trembling shadows, the long rows of shoots, green and prospering the week before, now protruded from the ground like bleached splinters of bone. Overhead, boiling up in an invisible thunderhead, a tumorous thickening in the layer of butterflies blocked most of the incident light.

"Well, normally, ma'am, passengers aren't allowed up here, but since it's just you and me, I figured it wouldn't hurt—rules are made for bending. Besides, it would be a shame for you to miss the descent: Teliat's butterflies are one of the wonders of the universe." The pilot nodded his head sagely.

"I'm surprised. I'd never heard of either the planet or the butterflies until sector headquarters contacted me," said Jena, as she strapped herself into the adjacent seat.

"Well, for one thing, the planet's a pretty new discovery; the colony is only three years old, so word hasn't gotten around much. And for another, it's not quite as pretty from the ground. I mean, it's nice and all that, but when you're sinking down through the atmosphere and you're surrounded by all them butterflies and colors and things, it's like nothing you've ever experienced. That's why I gave up my leave and volunteered to take this special run."

"It must be quite something then," Jena said.

"It is, ma'am," the pilot said, nodding his greying head vigorously. "Why, I would have done it even without the time and a half." He threw a sidelong glance her way. "Sector must be in quite a hurry to get you here, setting up a special flight with ships so tight and all."

Jena hid a smile. "Yes. It's no secret. The colony has been having severe problems with the butterflies. Apparently, since Sector has called me in, they think the butterflies may possess a fair amount of intelligence."

The pilot's eyebrows arched and he shot another sidelong look at Jena. "Truth? You wouldn't be having some fun at my expense, now would you ma'am?"

"No, honestly. I'm a telepath. Why else would they have to actually transport someone in? And since you're in the service, you know that interspecies communication is the only thing telepaths are really useful for."

"Yes, I'd guessed that's what you were, ma'am. I just find it hard to believe that those butterflies are very smart—they're beautiful, I'll grant you that, and there are lots of them too, but after all, their bodies aren't but the size of my little finger and their wings the size of my hands. Seems peculiar that something that little should be smart."

"Well, your superiors apparently think differently," Jena said. "Since they've seen fit to send someone on death's doorstep gallivanting halfway across the sector."

"Think differently," he repeated gravely. "Yes ma'am, that's true; a very polite way of putting it. But if I may say so, ma'am, although I had

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some doubts about your age at first, after seeing the way you zip around the ship I think you have a few parsecs left on you."

"Thank you," Jena said, surprised to feel a glow of pleasure. "I guess I still am pretty spry."

A soft tone sounded and the pilot glanced at his panel and touched a few controls; the body straps seemed to tighten slightly as the ship began to gently decelerate. "We're about ready to enter the atmosphere, ma'am."

"When do we encounter the butterflies?"

"Not for a while yet. They seem to stick pretty near the ground. Perhaps there's too much UV up here for them to handle. But you'll have a good chance to see them: we'll be going through them for about five minutes—the layer's between five and seven hundred meters thick and we go real slow through them so as not to hurt any—native life form regulations, you know."

Jena nodded, and they sat in silence for a while.

Another tone sounded. "Almost there," he said cheerfully. Touching a few more controls, he said, "There, I've depolarized the bow a little bit; you'll get a better look once we get a ways into the butterflies and we can depolarize all the way." Through the now-translucent forward wall, Jena could dimly make out a grey surface flickering with motion, like a wind-blown lake at dusk.

Time passed, a tone sounded, and the deceleration increased to almost a G for a few moments and then fell off to about half that. Moving shapes fluttered slowly upward past the ship. They reminded Jena of her childhood on Earth: of fall, when the leaves turned stiff and brown and fluttered to the ground—except here the process was somehow reversed: a forest of leaves fluttering up into the heavens. "This is the start," the pilot said softly. "You can't see them now, but these up here in the top layer are mostly white, so they reflect a lot of the light. As we get lower you'll see all different kinds of colors—it's a whole ecosystem."

By and by the pilot depolarized the bow the rest of the way, and Jena was transfixed by the vibrant multicolored light. They drifted down through a cloud of butterflies whose wings were of translucent grey, shot with twisting veins of vivid green.

"Yes," the pilot said in a hushed voice, in answer to her question, "as far as I know they're all like that—veins of color on a grey background." Yellow-winged butterflies began appearing among the greens, and soon displaced them. Occasionally, isolated bits of other colors fluttered by, and then a thin layer of crimson that was sandwiched in among the yellow butterflies, which was in turn displaced by light blues. Jena felt a sense of unreality, as though she were floating in a sea of light, clouds of colored bubbles tickling her vision as they flickered noiselessly past. And then an unmoving background appeared through the sea of butterflies, and the ship floated down out of the clouds of color toward the ground. A tone, a few touches on the control panel, and the ship decelerated softly and came to rest with a barely perceptible bump.

"Well, here you are, ma'am, hope you enjoyed the ride," the pilot said.

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"Yes," she said, "yes, I did. That was remarkable." She slowly unbuckled her body harness.

"Good luck. And when it comes time for you to return, feel free to request me—Dal Johnson—as your pilot. I love to come here. It makes me feel like I'm inside a giant kaleidoscope!" He tapped a control on a side panel and said, "Airlock's open. Be seeing you."

"Thank you, Dal," Jena said, smiling at him. "I'll request you if they give me a choice." She got up and ducked out of the control room, stepped into the airlock, and opened the outer door.

Leo, and his small daughter Betsy, watched as the ship sank slowly out of the multi-colored clouds toward the ground. Betsy gripped his hand tightly and stared with fascination. She had seen plenty of ships before, but never a real telepath. And now she was actually going to meet one! She wondered if he would be like Jak Mellanin on the vidshows, tall and blond with piercing blue eyes and a broad grin. Daddy had said that telepaths were just like normal people, but she wasn't so sure. He'd never met one, so how did he know? He certainly hadn't been able to tell her anything about this one. He said that telepaths were hard to get and that the people at sector headquarters hadn't known who they were going to send.

The ship came to rest on the ground. Her father said, "Come on, honey," and they walked toward the ship. She hoped the telepath would be nice. She remembered the evil telepath in one of Jak Mellanin's last movies. Betsy tightened her grip on her father's hand and edged slightly closer to him. Suddenly the ship's door began to move, and Betsy stopped. Smoothly and silently the door slid upward, revealing a white-haired old lady in a light blue cloak. Betsy gaped. Was this the telepath? There was Daddy, walking forward and holding out his hand and saying something.

"Thank you, Mr. Landa," she was saying, "the trip was fine. My name is Jena Thomas."

"Please call me Leo. And this," Leo stepped to the side and motioned to where Betsy had stopped, "is my daughter Betsy."

"Hello, Betsy, I'm pleased to meet you," the old lady said with a smile. Blue eyes twinkled beneath a head of white hair.

Betsy remembered her manners and said, "How do you do?" Then, getting up her courage, she asked doubtfully, "Are you really a telepath, Ms. Thomas?"

"Yes I am, Betsy—but please call me Jena; I'm too old for formality." And then she smiled even more, so that fans of little lines crinkled at the corners of her eyes and mouth. "I'll bet you don't think I look very much like a telepath, do you?"

Betsy shook her head. "You look more like a grandma."

Leo added, "I'm afraid she was expecting Jak Mellanin, or someone like that."

Jena chuckled. "Well, I *am* a grandma, and as for Jak Mellanin, I used to look a lot more dashing before I retired." Glancing at Leo, she said, "I've refused assignments for the last several years, but Sector was really desperate and said things here couldn't wait

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for one of the younger people to become available."

"Well, things are looking pretty grim here; if the current trend keeps up, in six months we won't be able to grow any food, and three months after that . . . Well, Sector just doesn't have the ships to evacuate ten thousand people."

Jena nodded soberly.

"That's the reason," Leo continued, "for the small welcoming party — everyone is busy on the remaining farms or in the labs. We've been making a massive effort to study the butterflies, although we haven't learned much of direct use yet."

"Could you summarize your findings? How are they disrupting your farming, and what makes you think they're intelligent?"

"Sure. While we're at it, why don't we head over to your lodgings so you can wash up for dinner."

"Thank you. That would be greatly appreciated." Leo pointed to a group of buildings and they began walking.

Leo rubbed his chin. "Well, to begin, your two questions are interrelated. Let me give you a brief history of what happened. For the first couple of years the colony prospered: we laid out farms and planted and harvested with no trouble whatsoever. Since things went so well we kept bringing in more people, and setting up villages and farms and so on. But then something strange happened. The butterflies formed thick clouds over the oldest farms, cutting off nearly all the light. Of course, the crops on those farms all died within a week or so. After that the clouds dissipated to their normal thickness, and curiously enough the remaining butterflies reseeded the land."

"Reseeded the land," repeated Jena.

"Yeah, that is to say they apparently gathered seeds from the native plants and scattered them over the land occupied by the farm. As you might expect, we were quite puzzled by all this and began research to try and discover the cause, but we weren't too worried. After all, if worst came to worst, we'd just have to move our farms every couple years—a nuisance, but something we could live with if there were no other solution."

"But apparently the butterflies weren't as slow to take action on your other farms."

"Yeah." Leo nodded. "As time passed, other farms were blacked out. Each time it was the oldest remaining farm, and each time the lag between when the farm was started and when the butterflies blacked it out was shorter. After a while we were able to calculate the function that governed the decrease in lag: as I've said, we have six months until it goes to zero. After that we'll have three months of food reserves. And after that . . . Well, even if Sector had enough ships, you know their policy on colonies." Leo shrugged.

"I see. Have you considered that the blacking out and reseeding behavior may just be an instinctive action? After all, your butterflies seem analogous in many ways to terrestrial social insects, which carry out activities that seem pretty complex, too."

"Well, that could be. If so the colony is out of luck, because the butterflies are essential to the ecosystem of Teliat, and we can't eradicate them without making Teliat uninhabitable. But we have other reasons for suspecting that

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their behavior is guided by intelligence rather than instinct. The main objection is that instinctive behavior is—by definition—inflexible. Yet the butterflies respond to new farms quicker and quicker. It looks to us, biased though we may be, like they're learning. Also we've discovered that when the butterflies reseed, they don't collect just any seeds, but instead reseed with the same mixture of flora which was there before the farm was established."

"That's most interesting, but certainly not conclusive," said Jena.

"Yeah, we know that. But if they *are* intelligent, I understand that interspecies communication takes time, and we don't have much. So we figured it was now or never."

"Yes, it can take time. But once we make contact, we've always managed to resolve the situation—if not to everyone's entire satisfaction, at least to the extent of averting major catastrophes. And if they're intelligent, six months ought to be sufficient time."

The warm breeze whispered through the leaves, and the cocoon, bound securely to a fork in the branch, shimmered like a coagulated rainbow in the multicolored light. Dimly visible through the translucent wrapper of cocoon, a grey form stirred. The brittle wrapper crackled softly, then split in several places. A butterfly crawled slowly forth from the shards of the cocoon, along one fork of the branch, and out onto a leaf of deep green, where it slowly unfolded its great wings and lay motionless in a patch of light. Predominantly grey, like smoked glass, the wings were covered with a dense network of twisting threads of brilliant crimson which shaded into orange towards the extremities. The butterfly's outstretched wings covered the leaf like a shadow; though patterns of colored light danced across the surface of the leaf, they vanished when they reached the wings, as though the grey wings were holes gapping into another world.

The butterfly rested, waiting patiently on the leaf, its wings open to the shifting patterns of the sky. Tuned during metamorphosis to a specific range of color-patterns, the butterfly submitted to the gentle massage of raining light. Overhead the clouds of butterflies danced, forming pools of color which flowed slowly through one another, their hues sparkling in the phase-locked frequency of each group's wing rhythm. Suddenly, there it was, almost directly overhead: a streak of shimmering crimson oozing through a cloud of pale yellow. Even at the first slight stain of color the butterfly's wings had tensed and shaken with tremors. Now, as the underside of the yellow cloud became masked by crimson, the butterfly exploded from its tree, and with powerful wingbeats fluttered wildly up into the sky, driven by a body-shaking instinct to join with the cloud. From nearby trees, other butterflies fluttered upward, the glowing threads of crimson which veined their wings mirroring the cloud's color, their wings already taking up the group rhythm.

Jena's mind probed slowly through the cloud, fixing on first one butterfly and then another and another. She would focus on a brain and, in a way she did not understand, discern the com-

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plex ever-changing pattern within; she searched for recurring complex patterns which, if found, she would try to correlate with sensory images or motor movements. She had isolated a few patterns, primarily those governing wing frequency and breadth of stroke. Sensory patterns were harder: the visual and tactile impressions of thousands of nearby wings produced a sensory environment so chaotic that she was unable to discern more than a few regularities with which to correlate neural patterns. With such a small repertoire of basic imagery to work from, discerning and interpreting abstract thought patterns was difficult. Every now and then, though, she'd sense traces of abstract thought patterns: there would be an abrupt alteration in a whole slew of basic patterns as the butterfly's attention would shift to different sensory images and alter its wing frequency and stroke breadth—but she was unable to locate the causative pattern. It was as though it had been present just a moment before she tried to focus in on it, but had vanished as she approached. Like a mirage, she thought in frustration, as she retreated to her body.

Jena rose slowly from where she lay. *Another failure,* she thought unhappily. *Three long months of one failure after another. There's not much time left,* she thought, stretching her muscles gently. During the quarter hour she had been there, her muscles and joints had stiffened and she had begun shivering, though the breeze was only slightly cool. I'm getting older and older, Jena thought wistfully; *I'm not even a spry old lady any more—just old. Old and useless.* She gazed bitterly up at the sky, at the dark storm of color which she knew to be a thick cloud of millions of butterflies—or what passed for butterflies here. In many ways, they were very different from the butterflies she remembered from Earth. They were larger, more variegated in color, remained aloft for much of their life, tended to fly in coherent groups, and engaged in a variety of complex activities—chief among which was the destruction of farms. So many differences, she mused, and yet it was inevitable that they be tagged as butterflies: like terrestrial butterflies they staggered and wobbled through the air, as though drunk on nectar and unused to Teliat's low gravity; and like the butterflies of Earth, their awkward beauty and the ceaseless energy which they exhibited in spite of their frailty made them apt symbols of life.

It was ironic that creatures which symbolized life should be destroying the colony, Jena thought to herself. And they were more than just symbols; they were the keystone of Teliat's ecology. The butterflies formed a living sheet which stretched over the entire day-side of the planet, the grey portion of their wings absorbing enough of the constant sunlight to supplement their stored reserves of energy. The colored portions of their wings reflected enough sunlight to make the surface habitable for both the native plants and the colonists. When butterflies made their occasional descents to restore their flagging energy reserves with nectar, they served as the sole pollination mechanism for Teliat's plants. After the final descent to lay eggs and die, their bodies fertilized the soil. And when the new eggs hatched, the caterpillars, ravenously accumulat-

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ing the materials needed for their metamorphosis, kept the fecund plant life in check. *It all forms a nice tight pattern,* Jena thought; *the question is, is there room for us?*

The dining hall was only three-quarters full; a number of critical experiments were going on which couldn't be left unmonitored. In deference to the crisis, the custom of the entire village gathering for dinner had been abandoned, and the people in the research division had started taking shifts. Jena stood in line and stared at the floor, trying to avoid being drawn into conversation. She sniffed the odors wafting from the kitchen and wrinkled her nose: mushrooms again. Now that the farms were being blacked out immediately, the only fresh produce they had was mushrooms and sprouts germinated from their rapidly dwindling store of seed. And due to a disastrous spoilage which had wiped out half the colony's reserves of grain, it looked as though they only had a month left, rather than the three they had been counting on. Not that it would make any difference, Jena thought to herself. Everyone is hoping for a miracle, but I'm failing them.

Concealing a sigh, Jena took her tray and looked around the dining room for Leo. There he was, off sitting alone on the far side of the hall, ignoring his dinner as he scribbled in his notebook. She made her way across the room. "Can I join you?"

The big man looked up. "Sure, have a seat. Any luck today?"

"No," said Jena, shaking her head slowly, "none."

"I thought not," he said glumly. "I'm convinced that they're not intelligent." He closed his notebook with a snap and held up his hand to forestall her interruption. "We made a breakthrough today," he said without enthusiasm. "We've discovered why they're blacking out the farms. I told you some time ago that we'd discovered that the butterflies' eggs—regardless of which subspecies laid them—all contain precisely the same genes, so that there's nothing to account for their subsequent differences."

"Yes, I remember that," Jena said. "And you also told me that there was additional genetic material in the adults, and that it differed from one subspecies to the next."

"Yeah. Well, we found out where it comes from. It turns out that the butterflies get the extra genes from the plants—either modifying plant genes or using the plants as gene reservoirs. We don't fully understand what's going on, but the general picture is that the extra genes are non-transmissible. The genes in the germ plasm are coded only to produce the single type of caterpillar. Then each type of caterpillar, in feeding on the plants, takes in the genes necessary for the transition to the butterfly stage. Since different plants have different genes—or are used to store different genes—that accounts for the huge variety of subspecies."

"That's really quite interesting," said Jena, momentarily forgetting her dejection. "That means there's a very tight coupling between the butterflies and the plants. The butterflies partially control the numbers and distribution of the plant species through pollination and reseeding, and the plants in turn control

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the proportions of the various subspecies."

"Yeah, it is interesting. But it mostly just convinces me that their behavior is instinctive and not intelligent. When they black out and reseed the farms, they're just defending their gene pool. If that's not something that would be instinctive behavior, I don't know what is. And if they're not intelligent, I'm afraid the colony is pretty much out of luck, isn't it?"

Jena sighed and stared at her tray. "I'm afraid that's true, Leo. If we were dealing with intelligent organisms, the task would be to persuade them to change their own behavior. But if the behavior is instinctive and the organisms aren't sentient, then their behavior must be altered by an outside force. Although telepaths can alter the patterns of neural activity which generate instinctive behavior, in this case there are billions and billions of organisms whose patterns would have to be altered one by one. Even with all the telepaths in the sector it would take decades." Jena looked up: "And we don't have decades."

"Yeah. I was afraid of something like that. Anyway, tomorrow I'm going to try and make arrangements to get Betsy out."

Jena lowered her eyes again. "Don't waste your time, Leo," she said softly. "You know the rules; no one gets out of a failing colony. They aren't even going to let me out."

"What! But why? You weren't a colony member, you didn't commit yourself to Teliat."

"There are lots of reasons, Leo. Nearly all of Sector's ships are tied up at Lilliand, by the possibility of war between humans and the natives. The remaining ships are spread far too thin to save one telepath. Particularly a telepath who has, at best, only a few years left anyway. And, I have to tell you, a telepath who may have lost her ability."

"What do you mean?"

Jena took a deep breath. "It is possible that I may have lost my ability," she repeated. "It could be that the butterflies are intelligent, and I just can't tell."

"I didn't realize that could happen," Leo said, looking concerned. "Don't you know? Can't you tell just by trying to read one of us?"

"Not necessarily. People think of telepaths as reading minds; but minds are really just patterns of activity in brains, which I am able to sense and influence to some extent. And since minds are in brains, the factor of physical size comes into play. When dealing with a mind in a brain of a very different size or structure, one has to alter the scope of one's sense—focusing, I call it, and that is the key to telepathy. The thing is, the ability to focus has been known to deteriorate with age—my secret fear is that the butterflies are intelligent and that ten years ago I wouldn't have had any trouble detecting it."

Leo shrugged. "But you've said you can detect motor and sensory patterns in the butterflies—so obviously the brains aren't too small."

"Not necessarily. Sensory and motor patterns are usually fairly simple and, furthermore, tend to be spread out across the surface of the brain in a standard pattern—a sort of distorted projection of the organism's body. Abstract

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thought patterns tend to be more intricate, more compacted, and more idiosyncratic. It's possible that they're too dense, just beyond the threshold of my ability to resolve them."

"Damn," Leo said softly, "damn."

Jena said nothing. She sat, chin in hand, silently scrutinizing the other hand which rested in her lap, as though it belonged to someone else. She noticed the web of wrinkles which covered it, the bluish veins which twisted just below the surface; the slight tremor when she lifted the hand to grasp her glass. For a moment she saw it as a butterfly wing, blue-veined, fragile and trembling, but bringing death nonetheless.

"It's not your fault, Jena," Leo finally said. "Chances are they aren't intelligent at all. Even if they are, you can't help getting old. I'm just sorry that those bastards won't evacuate you."

"It doesn't matter that much, Leo—not to me. Part of me will welcome death. Growing old is hard. It's hard to feel your strength leaving you, to feel yourself becoming feeble and to know that eventually you'll be dependent on others. It's hard to get stiffly out of bed in the morning and see the lined face of an old woman peering out of the mirror. I used to be beautiful, you know."

"You are beautiful," Leo said softly, "and those lines—they just give your face character."

Jena smiled wistfully. "Thanks. I've got lots of character then. You know, until recently it would surprise me when I'd look in the mirror. I didn't feel especially old, so why should I look it? Silly, I know, but that's how I felt. Now I'm resigned. Death will be a relief for me, even though the thought still frightens me a bit. But I'm really sorry for you younger folks; you're probably not as ready as I."

"No! We're not, at least I'm not," Leo said, pounding the table softly for emphasis. "You shouldn't be either — you're just being morbid! We still have at least a month before we talk about giving up. A lot can happen in a month."

In her sleep, Jena's muscles tensed slightly, and her eyes darted here and there beneath her closed lids. In her dream she was back on Earth, a little girl again, with her mother and father and brother and Grandma. Grandma. It had been scary ever since Grandma had come to live with them. She remembered, or thought she did, when they used to go to visit Grandma when she had lived in the country. Then she had been nice and kind and baked cookies and told wonderful stories about when she was a girl. But now that she had come to live with Jena and her parents, she was different. She couldn't walk without help and most of the time she didn't even notice Jena and she never made cookies any more. Mostly she sat on a rocking chair on the porch and rocked and rocked and rocked, staring off into the distance.

The rocking chair creaked again and again, as if in pain. Jena glanced up at Grandma and then rose from where she was sitting to go back into the house. The creaking stopped and Jena looked up with wide eyes: Grandma had stopped rocking and was staring at her. Jena froze. Grandma smiled toothlessly and said, "Once upon a time I was a little girl like you. I ran and played and had

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fun." Her face darkened. "But now all I can do is rock back and forth, and wait for people to do things for me. It's no fun, no fun at all! Please, little Jena, will you trade places with me? I'd like to play again, just for a while." But Jena could say nothing; she stared, transfixed with horror. And then something far in the distance, or perhaps far in the past, caught her grandma's eyes, and she resumed her slow rocking. Jena stood rooted to the floor, unable to move for fear of catching Grandma's attention again, and listened to the creak of the worn rocking chair, and watched its shadows move rhythmically across the lawn, like a great shadowy butterfly drying its wings. Creak, creak, creak. After what seemed like ages she broke the spell and rushed into the house to find Mother. But no one was there; just empty room after empty room, all filled with dust and fragments of bone which crunched as she ran. Jena awoke, shaking.

Jena calmed herself, running her wrinkled hands over her pillow to feel its soft coolness. Why do I fear death so much, Jena asked herself. I understand my fears about growing old and feeling useless. I'd hate to end up like my grandma. But why fear death? That's the release from all that. I guess it's something you just absorb from the social environment. Funerals, mortuary ads, the reluctance of people to discuss death and their negative reactions when they do, all the little rituals and protocols that are distributed throughout the social environment converge on the individual, on me, and convince me, deep down inside, that death is to be feared regardless of my rationalizations.

Then her thoughts froze. It was as if she had been strolling casually along and suddenly found herself on the brink of an abyss whose existence she hadn't suspected. "Distributed throughout the social environment," she murmured to herself. And the genes for a single butterfly are distributed throughout the physical environment. Perhaps, like the genetic information, the behavioral information is also distributed. Perhaps the abstract thought patterns are distributed over large numbers of butterflies, in the same way that certain beliefs are distributed through various aspects of a culture.

Jena closed her eyes and let an image fill her mind. Small knots of activity—the brain patterns of butterflies—danced like dust motes, each brain-mote isolated from the others by vast distances. Slowly at first, then more and more rapidly, a few brain-motes began growing projections of shimmering light: rays of color which lanced through the space and struck other motes. These responded with other rays of light, until a great ever-changing pattern of shimmering color hung in space, a brain-mote at every vertex. By and by there was a subtle change in the image: the brain-motes, which had at first seemed to bind the pattern together, now seemed to fade into the background, leaving only the shifting web of pattern shimmering before her mind's eye.

That could be it, she thought, clasping her hands tightly together. That just could be why I've been failing: instead of trying to focus in on one of the butterflies, I need to defocus, I need to try and grasp the patterns in the interactions between different butterflies, or perhaps

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between different groups of butterflies. The cloud of butterflies may be intelligent when taken as a whole, or the whole cloud may have a single pattern governing its instinctive behavior. Either way there's a good chance of success. My age may actually be an asset, allowing me to defocus more than a younger telepath ever could! I'll go out and try right now, she decided; I'll never get to sleep not knowing.

Jena got out of bed and began to dress, then stopped. Defocusing may be dangerous, she thought. I've never heard of anyone trying it; perhaps there's a reason. I'd better leave a note for Leo, she decided, telling him what I've come up with and what I'm trying to do, so if the worst should happen, maybe they can still bring in someone else. Then she shook her head and chuckled. "Just listen to me. 'If the worst should happen'—how melodramatic. I've decided I'm ready to face death, if that must be—and even if I'm not, there are thousands of others who aren't either. I've got to try."

Jena dressed and left the lodge, stopping by Leo's room to pin a note to his door. She then set out across the fields to the farm she had visited the day before. The large concentration of butterflies there might make it easier to grasp distributed patterns of thought, she thought to herself.

Jena selected a comfortable spot next to a withered bean field and lay down, relaxing her muscles and calming her mind. After a few minutes she projected her mind upward until, all about her, she could sense the tiny knots of activity in the brains of the butterflies which fluttered above the farm. Rather than focusing in on one of the knots, she chose one as a reference point and let her mind slowly expand. As she did so, she began to sense patterns. Within the cloud the butterflies' wings beat in phase, sending pulses of light flickering from the wings of one creature to another; the three-dimensional configuration of the butterflies slowly changed, changing the pattern of pulses. Somehow, Jena sensed, the hues varied too, shifting a few nanometers, building up an intricate pattern of frequency and color.

Then, in a flash of glad recognition, she saw how the pattern correlated with the environment below. Jena let her mind expand further, and perceived the pattern within another cloud, and the pattern of interaction between the two clouds. The systems of pattern grew more and more complex as her mind expanded further and further, but she failed to encounter any feeling of consciousness or sentience—just increasingly complex patterns of interaction.

She reached farther and felt a warning from within herself. She hesitated . . . perhaps the butterflies were not intelligent, perhaps this was just part of an incredibly complex instinctive mechanism. But even so, I still might be able to alter it if I can just find the right pattern, she thought vaguely. By now she was extended so far that thoughts of her own were difficult to maintain. Her thoughts were superimposed over the complex patterns of hue and frequency which she was attempting to monitor and now alter, and kept getting blurred by compelling changes in wing rhythm and hue.

Steeling herself, she relaxed and ex-

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panded further, and felt herself stretched over and through and around a system of dynamic patterns which was slowly beginning to become comprehensible. A vast system of ungoverned, unconscious thoughts, maintaining itself and the creatures and ecosystem on which it depended in an exquisite balance. She dimly felt her breathing falter and, in a final effort, willed her mind to expand beyond its limits as she reached out, trying to grasp, to caress, to alter the patterns just slightly. Her thoughts merged with patterns of flickering color, and consciousness faded even as her mind's embrace encompassed the entire butterfly cloud.

Leo knelt beside Jena's body. There was no pulse, no breath. Her body was cool. He was too late. He damned himself for staying at the lab so long; damned her for leaving a note on his door instead of calling him. It could have been prevented, he thought, it should have been prevented. Kneeling beside her body, which looked so peaceful and yet so frail, he wept for her.

After a time, something penetrated his shroud of grief. Blinking through his tears, he looked up. No one was there, and for a minute he looked around, puzzled, unable to find what it was that had disturbed him, that still disturbed him. Then he saw it: the twilight had vanished and the normal colored light of Teliat's day flickered around him.

Later, reports came in from all over day-side. The shrouds of twilight had vanished from the farms—even those which had just been planted and whose crops were still living. Jena had succeeded at the cost of her life.

Jena awoke, if wakening be the name for it. Gradually awareness flowed through her like sunrise: first a dim perception of . . . something; then, as sunbeams piercing through the mist, fragments of awareness struck her.

Billions upon billions of wings beating in a maelstrom of color, seething jungles of stem and leaf dancing wildly, glimpses of a frozen sunrise accompanied by frigid gusts of wind, great fields of grey fronds rippling with the breeze, streams wending their way through field and forest. Then the fragments congealed, and the planet flickered and danced around her and beneath her, and over her arched the sky, a dome of luminous blue shading into a band of rose and lavender—sunrise frozen for all eternity.

Through it all Jena's mind flickered, a dynamic pattern of light flashing among billions of wings, distributed across the planet. Superimposed over the smaller and more local patterns, Jena guided and altered them, adjusting frequencies and hues, weaving a new cocoon of light and color about the planet which would allow it to bring forth new life. ■

The difference between a rabbit and a rock is the information content, and the difference between a living and a dead rabbit is in the availability or usability of the information.

Dr. John A. Ball

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The Alternate View

THE STRATEGY OF TECHNOLOGY

Jerry Pournelle

Astute readers will recognize that this month's title comes from the 1970 book by Stefan T. Possony and Jerry Pournelle. *Strategy of Technology* has been used as a text by the United States Air Force Academy and the Air War College; it is, alas, out of print, although Steve and I hope to revise it Real Soon Now.

Before we get into the column topic proper, some good news.

The First L-5 Convention was a rousing success. Fan Guest of Honor Robert A. Heinlein said it was the best weekend he's had in years. I heartily agree; it may have been the most interesting convention I've ever been to. Attendance was nearly a thousand, with an excellent mixture of professionals, such as Guest of Honor Fred Haise, Buzz Aldrin, Hans Mark, Arthur Kantrowitz, my colleague G. Harry Stine, Stefan Possony, Danny Graham, etc.; and space enthusiasts like Larry Niven, Ben Bova, BJO Trimble. . . . I have a problem in choosing names; there were so many friends there. The ones above are quite literally chosen at random, and I hope I've offended none by leaving them out. I couldn't possibly list all the guests we had.

There was an important session on design of a lunar colony, conducted by Count Renaldo Petrini, Ph.D., a well-known Houston architect. Everyone at the convention was invited to help out, and the results have been impressive. Dr. Petrini and his associates are planning two more (invitational) sessions. What they've got so far is both aesthetic and practical; they'll do an article on it soon.

Although I was in theory Convention Co-Chairman, I don't hesitate to brag about how well run it was, for in reality I had nothing to do with convention operations. I went about entertaining guests; the real work was done by Co-Chairman Milt Stevens, many members of the Los Angeles Science Fantasy Society, and Deputy Chairman James Ransom of the Aerospace Corporation.

I won't make this a convention report; for that you should refer to the L-5 News (L-5 Society, 1060 E. Elm St, Tucson AZ 85719, $25/year): but I will give a few anecdotes. Overheard in the operations center:

Speaker (an important aerospace executive): "This is the best-managed convention I've ever gone to. They show you where to go, things start on time, and they have those continuation rooms for people who want to ask questions. It's great!"

Operations Assistant (veteran of many

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SF cons): "This is the easiest convention I've ever worked. The speakers show up on time, they're prepared, and they're *sober!*"

One high point: watching Mr. Heinlein watch Fred Haise listening as Frank Gasperik sang "The Ballad of Apollo 13."

Next year the L-5 Convention will be in Houston. I cleverly stuck space attorney Art Dula with the job of chairing it. Mr. Heinlein is planning to attend. When I know the dates, I'll tell you; but the *Analog* pipeline is pretty long, so it might be well to write L-5 in Tucson; this year we sold out the banquet tickets.

I'm writing this in early May. There have been a number of news items I can't get out of my mind.

Item: the sinking of *HMS Sheffield* and the renamed cruiser *Phoenix*. A number of news magazines have written of the Falklands naval battles as "the battle of the computers," and in a real sense I suppose that's true. The Argentine cruiser was sunk by modern "smart" torpedoes that can be fired from many miles away and are nearly indetectable; *Sheffield* succumbed to a French Exocet missile, which can be launched from well over the horizon at nearly any altitude, after which it flies at nearly supersonic speed about ten feet above the water.

There have been any number of articles on what all this means. Some conclude that the era of the big carriers is over, and that the U.S. Navy ought to scrap its plans for more *Enterprise*-class ships in favor of several smaller carriers equipped with helicopters and vertical takeoff and landing (VTOL) planes. Other analysts draw precisely the opposite conclusion: that the big ships with their "full capability" aircraft can better defend themselves, and if hit are more survivable.

Item: In today's *Wall Street Journal* there is an article about the U.S. Army in Germany. It's a good army, the article concludes; but it's greatly outnumbered. We have a variety of new antitank missiles and equipment, but not enough money to let the troops fire the things in training—and there are a lot of Soviet tanks just across the border. One captain speaks for all when he says, "There may just be more tanks than we can kill."

Item: Any number of demonstrations for a "nuclear freeze." Since enhanced radiation weapons are among the high-tech items the Army is counting on to stop Soviet tanks, this interacts with the above—and a number of powerful senators, including Kennedy, have joined the "freeze" movement.

Item: we still have a Strategic Arms Limitation Treaty that forbids us to build any missile defense system that would protect our population. (Under SALT I we are allowed to but have not built a system to defend a single *missile* site; but no defenses of population centers as such are permitted. The Soviets have chosen to build *their* defense system to protect the missile site close by Moscow. . . .

A final item, one that didn't get much publicity: a Czech grocery clerk was sentenced to five years at hard labor for "possession of an unlicensed mimeograph machine."

One of the featured speakers at the L-5 Convention was Lt. Gen. Daniel O.

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Graham, U.S. Army (Ret.). General Graham is Director of Project High Frontier. The basic High Frontier report can be obtained from PROJECT HIGH FRONTIER, 1010 Vermont Ave. NW Suite 1000, Washington DC 20005 for $15; and I urge anyone interested in the military future to get a copy and study it. Fair warning: some of the analysis in the High Frontier report comes directly from the Citizens Advisory Council on National Space Policy, of which group I am Chairman; so I am hardly unbiased.

My copy of High Frontier comes with a letter of endorsement signed by Buzz Aldrin, who met General Graham at the L-5 Convention; one thing the L-5 Con accomplished.

The basic thesis of High Frontier echoes what Possony and I wrote in *Strategy of Technology*: that the decisive war need not be fought with blood and treasure—and in fact *must* not be. There is a way to defend Western Civilization—warts and all—without destroying the planet.

Major premise: It's bloody expensive to try to match the Soviets tank for tank, gun for gun, ship for ship. They can keep a lot more of their population under arms than we can; certainly they can build large armies cheaper than we can.

If we continue with "the incremental approach" to defense—buying more of this and that, buy more airplanes, more guns, more tanks, more bombs—we will do nothing decisive, and we may well go bankrupt trying it. We also accumulate the means for killing the lot of us.

Instead, let us take a bold new approach: let us sidestep the enemy, and take the high ground of space.

Our present strategic doctrine is Mutual Assured Destruction, often abbreviated (by its enemies, of whom I am one) as MAD. MAD says that wars cannot be won; they can only be deterred; and therefore to prevent war all nuclear powers must *mutually* have the ability to destroy each other. MAD adherents oppose civil defense, not on the grounds that it won't work, but that it *might* work. If we could truly defend some of our population, then we would not be hostage to the Soviets; assured destruction would not be mutual.

Those who support General Graham's strategic thesis would restore defense to its proper role: would opt for *Assured Survival* as the proper strategic doctrine, and see that the arms race concentrated on *defensive* weapons that would protect the U.S. population.

Defensive systems are inherently stabilizing. They deal handsomely with the "mad general" scenario (unauthorized launch of a single nuclear missile). For technical reasons one can never be certain of one's defenses, especially against a determined and sophisticated enemy; but defensive systems can very likely deal with any power other than the Soviet Union, and that in itself is desirable. Finally, by complicating the other side's strategic war plan, defense systems make it very difficult to predict the outcome of a strategic nuclear exchange — which makes it very unlikely that anyone would launch a strike in the first place. You don't start a big war unless you're fairly certain you can win it.

The point is that the High Frontier strategy does not seem incompatible

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with a nuclear freeze: certainly it is not incompatible with a freeze on *offensive* nuclear weapons.

I don't know the optimum mix of big and little carriers for the future. As a maritime nation, the United States has always required naval forces to keep our sea lanes open, and Marines to project our power beyond our borders—indeed, the Constitution makes an important distinction between armies and navies. Certainly we need ships.

Equally certainly, ships have become increasingly vulnerable. I don't know whether the U.S. provided the Royal Navy with intelligence on the location of Argentine ships and aircraft, but certainly we could have. Imagine a sea battle of the future: satellites spot the enemy's vessels and locate them to within a few feet (or even inches!) on the Earth's surface. Missiles can then be dispatched from aircraft or submarines well over the horizon from their targets. If a single air-launched Exocet can sink a modern ship like *HMS Sheffield*, what's safe from a dozen missiles?

There's more to the High Frontier strategy. One of the systems examined by the Citizen's Advisory Council was Project THOR: the ability to call down fire from heaven. The THOR system would consist of "flying crowbars" about five feet long, with a simple-minded guidance system and tiny vanes for aerodynamic control. They could "know" what a tank looks like from above—and when activated (de-orbited), thousands would home in on anything that looked like a tank. THOR wouldn't be easy to build—but then it isn't easy to build Enhanced Radiation Weapons (and it may be even harder to deploy them in Europe, given the present mood . . .). It would be even simpler to build orbital anti-ship weapons of the THOR type.

Now that final news item.

How many *Analog* readers publish fanzines? How many more are prepared to live where possession of an unlicensed mimeograph machine is a penal offense? *Can* you live under that kind of regime? I don't mean "Are you willing to?"; I mean *CAN YOU?* For I suspect many of us cannot; that, try as we might, we just wouldn't be able to cooperate with people who see a mimeograph as a dangerous weapon.

I'm writing this at midnight. When I get it done, I'll log on to a computer network that connects me with thousands of friends all across the nation. There are a number of those networks and more are inevitable. Computers make it easy to communicate, and computer literates seem inevitably drawn toward communicating with one another.

Is it true that modern warfare is a battle of computers? Certainly it is a battle of high technology. I can't prove it, but I am prepared to argue that a nation whose youth grow up as computer literates will have great advantages in high technology warfare; and that our home computers are producing hundreds of thousands of computer literates.

A nation that sends people to jail for possessing an unlicensed mimeograph machine cannot possibly allow a computer revolution within its borders: it would be tantamount to allowing freedom of speech. ■

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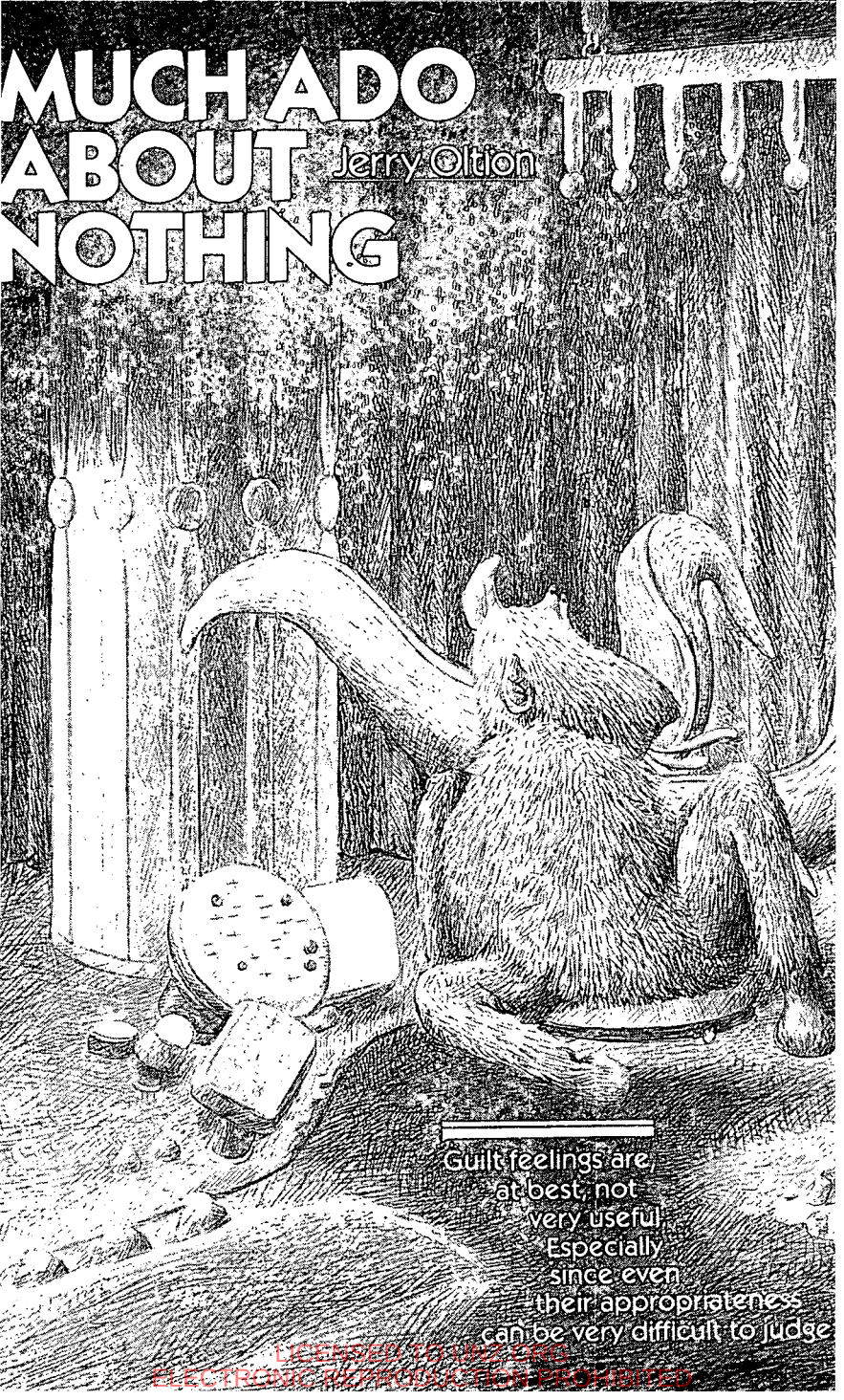
MUCH ADO ABOUT NOTHING

Jerry Oltion



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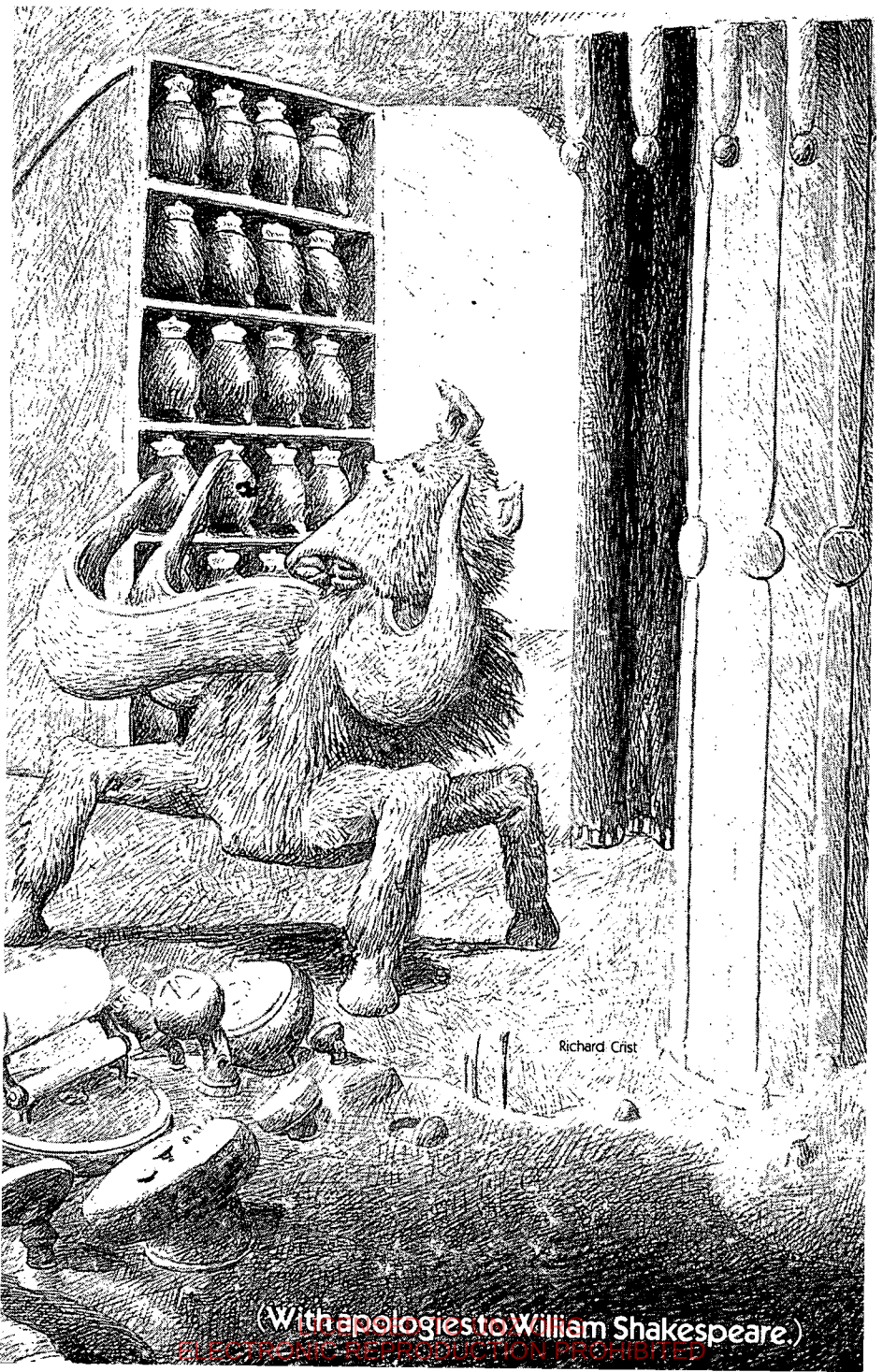

(With apologies to William Shakespeare.)

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Quiffik stood at attention. He held his three manipulating tentacles respectfully below and to either side of his lowermost eye, his eating tendrils even and still, and his two uppermost eyes directed straight ahead at a point just over Captain Trovven's head. In deference to the captain's rank he kept all three ears turned forward, and he tried not to let them twitch at the shouting.

Trovven's eating tendrils were bright green at the ends with rage. They radiated out in all directions from his mouth, like ejecta from a supernova explosion. "I don't want excuses!" he shouted, nearly rising out of his chair with the effort. "I want those krem out the airlock! This is an exploratory vessel, not a zoo, and I won't have krem running around on board, do you understand?"

Quiffik blinked his lowermost eye, shifted weight momentarily to his rear leg, and said, "I have them in cages, sir. They're not—"

Trovven's exhalation fluttered his eating tendrils like flags. "I don't care if they're embedded in plastic! I want them off this ship! Now! We'll be landing in a couple of hours, and I want every last krem dead before we do. Do you have any idea what could happen if they got loose down there?" Trovven answered his own question. "They could destroy every living thing on the planet, that's what! And I'm not going to take chances just because some idiot engineer can't leave his pets at home. Out the airlock, Quiffik; that's an order!"

"Yes sir," Quiffik said, then, hesitating, he went on. "But sir, I don't understand. Krem are harmless herbivores. How could they kill anything?"

Trovven took a deep breath, during which he contemplated how someone could get to be an engineer on a starship without knowing a thing about biology. He counted to a high imaginary number, stilled his quivering tentacles, and said, "They could reproduce, that's what they could do. Krem are very good at that. Small as they are, they would wreck the whole planet simply by reproducing. They don't have to kill directly; they can do it just as effectively by eating another animal's food supply. You see, the life forms down there have never met up with our kind before, and they wouldn't have any defense against something we introduce from home. We've got to be careful about everything, even microbes, but *krem!* You know how hard krem are to exterminate. Well, imagine what would happen if a breeding triplet got loose where they had no natural enemies. They could overrun the planet in a year!" Trovven leaned forward and fixed all three eyes on Quiffik. "I don't like killing things any more than you do," he said, "but we can't afford to take any chances. Those krem have got to go. Do you understand?"

"Yes sir."

"Do it then. And Quiffik—"

"Yes sir?"

"Keep out of trouble."

"Yes sir."

Quiffik swiveled around and moved swiftly out the door. As soon as he was out of the captain's sight his ears fell limp and his eyes threatened to cross. Space his krem! They'd been his only friends on the long voyage between stars. To just stuff them out the airlock

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now—what a way to repay them for their companionship. He knew that Trovven was right, but that made it no easier.

He sometimes wished he'd never signed on for the expedition. Sure there would be fame and recognition for being on the first voyage to the stars, and when he got home he could give up engineering to become the poet that he'd always wanted to be, but in the meantime it was all monotonous drudgery, made even more so by Trovven's militaristic rule. Quiffik didn't fit into that kind of a mold. Only his krem and the thought of actually setting foot on another planet kept him going from day to day. And now he would no longer have the krem.

He couldn't look into the cages as he put them in the airlock. He set them close together near the outer door and turned back into the ship, closing the inner door behind him. He didn't pump the air out of the lock, but instead pulled the eject handle as soon as the inner door had sealed. There was a thump as if something had brushed by the side of the ship. When he closed the outer door and opened the inner one, the cages were gone. He tried not to think about it.

For the next few hours, it wasn't hard. They were taking the ship down, and Quiffik was too busy monitoring the engines to think about krem. Blood rushed green in his veins with excitement at the thought of landing on an alien planet. At last! And what a strange planet it was! It was nothing like Quelch. This planet, the third one out from its star, was smaller, had less air, and spun faster on an axis that was tilted at an astonishing angle to the plane of its orbit. It had a single gigantic moon that no doubt produced catastrophic tides on the surface. Yet despite all that it held life! The planet was covered with it, and at least one species was intelligent. Well, Quiffik thought, maybe that was stretching it a bit, but they did build cities.

Trovven had deliberated a long time before deciding to land. The Quelchie had never encountered another sentient race before, and it made sense to be cautious. They couldn't know what kind of strange creatures might inhabit such a hostile planet. They might be friendly, but then again they might not. Whatever the case, the Quelchie couldn't very well study the planet from orbit without being seen and possibly causing a disturbance among the natives, and they wouldn't get much useful information from farther out, so that left no choice but to land. There were quite a few uninhabited areas where they might safely hide until they learned more about the planet and its occupants, and though they would have to be careful about contamination, they would be able to learn much more this way.

They took the ship in fast, dropping low to the ground and zig-zagging for a few hundred miles before heading for the hiding place that Trovven had picked out. It was a small lake in the middle of a low mountain range, far from any major population centers. They dived in over the last ridge and landed with a splash in the middle of the lake, then slowly sank to the bottom.

Nervously, engines ready to lift at a moment's notice, they waited. High in

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the sky an air vehicle left a white wake as it continued on toward the east, but it showed no sign of seeing them. They waited longer.

Finally, after a full day at alert, Trovven relaxed and let the scientists out to collect samples of the planet. He made them wear pressure suits even though the thin air checked out to be breatheable, and they had to disinfect themselves both coming and going with a blast of full-spectrum radiation before they could leave the airlock. Trovven was taking no chances.

The scientists were already developing theories and arguing among themselves about the strange conditions on the planet. The most puzzling feature was the axial tilt, and that had them all stumped. How could anything live in the varying conditions that that must bring about? Temperatures must change drastically as the planet swung around the sun in its orbit, exposing first one pole to the light and then the other. No known organism could survive under those extremes, yet the biologists cheerfully brought in hundreds of samples that were doing just that. Quiffik looked at them through the glass walls of their airtight environment boxes and marvelled at the diversity of life. They were like nothing he had ever seen before.

Some of the animals bore a certain resemblance to those of the Quelchie home world—some even reminded him vaguely of krem—but the plants were totally different. The ones that would fit into the environment boxes were flat, slender, blood-colored things, but the biologists brought back tales of some that were taller than ten Quelchie and as stiff as hullmetal. The mountains were covered with them. Quiffik wished he could go out and see for himself, but Trovven wasn't letting anybody but the scientists off the ship.

Three days after the landing he was down in the engine room running static tests on the gravity polarizers when Raffid, the ecologist, stuck his head through the door.

"Ah, there you are!" he said. "I've been looking all over the ship for you. Could I get you to lend me a tentacle with the flyer? I finally talked Trovven into letting me take it out."

"Really?" Quiffik said as he closed the access panel and levered his way out from between two thrust rings. "I'm surprised. He's really paranoid about even being here, much less flying around."

"He's the captain; he's supposed to be paranoid. But I convinced him that we need to look at some other areas of the planet too, so he's letting me out to scout around. He won't let me get out of the flyer, but I can at least take pictures."

"Yeah? That's still a better deal than I get. I could be the only Quelch on board to go home without setting trodpad off the ship."

"Oh, you'll get out eventually. We'll be here a long time just studying the life forms, and then there's the native race to contact too. You'll have lots of opportunity."

"I hope so. Has Mottik had any luck with their language yet?"

Raffid waggled his ears. "None at all. He's still trying to detect meaningful patterns in their video broadcasts, but so far he's found nothing."

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"Hmmm. They must be more complex than we thought."

Quiffik led the way into the hangar bay, where the flyer was still fastened to the floor with a set of wide straps. It was small, simply a gravity polarizer with a bubble on top; barely twice the height of a Quelch and double that in circumference. Quiffik released the straps and threw them over the top, then opened the bubble and climbed in.

"Stand back," he said, and turned on the power. There was a soft hum, and the control board lit up. Quiffik watched as various systems indicators evened out. When the last light blinked off he fed power gently to the polarizer. The flyer lifted up, but the phase light came back on and he could feel a faint vibration in the controls. He set it back down, climbed out, and opened an access panel in the side.

"What's wrong?" Raffid asked.

"Nothing major. Phasing's a bit out from sitting idle for so long." Quiffik adjusted a setting in the engine, climbed back up, and tried it again. The light stayed out.

"There. I can't test it under heavy load without taking it outside, but this ought to do for just flying around. Don't feed it more than ten gees or so and you ought to be okay. Keep an eye on that phase light, though."

"Right." Raffid climbed up and settled himself in the seat. He pulled the bubble down over him and fastened it, then edged the flyer over to the big cargo airlock. Quiffik opened the door for him and closed it behind, then ran the sterilizing cycle and then the airlock cycle. He watched through the port as water rushed into the lock, then the outer door opened and the flyer floated out and up.

"Lucky Quelch," he muttered as it disappeared from view.

He was just finishing up on the engines a few hours later when the whole ship rang with Trovven's voice on the intercom. "First Engineer Quiffik, report to the captain immediately!"

Quiffik nearly dropped a heavy piece of test equipment on his trod-pad. He manged to get it onto a bench, then, smoothing his tendrils out along the way, he ran up the corridor to Trovven's cabin.

He took a couple of deep breaths outside the door, then knocked and announced, "First Engineer Quiffik, sir."

"Don't just stand there; come in! You've just volunteered for a rescue mission."

Quiffik stopped just inside the door. "A rescue mission, sir?"

"That's right. That fool of an ecologist Raffid has got himself stranded with a phased-out polarizer, and I need somebody to go fix it before the natives spot him. That's you. You do know how to re-phase a polarizer, don't you?"

"Yes sir." Quiffik screwed up his courage and said, "In fact, sir, I think I could talk Raffid through it over the radio. It's quite simple, sir."

"No doubt," Trovven rumbled, "but Raffid hasn't got a suit, and even if he did I don't want him opening up the bubble. I'm still not convinced we're safe from cross infection. You'll just have to suit up and go fix it first-tentacle."

"Yes sir!" Quiffik couldn't keep the excitement out of his voice. A chance to go outside! But then he had another

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thought. "Uh, captain? We've only got one flyer, sir. How am I going to—?"

"You'll have to walk. It's not far, and the gravity is less than you're used to. Raffid managed to nurse it almost home before the polarizer went out for good. He estimates about half a day's walk in this terrain. If you shake it you can get there by dark and ride back on the flyer."

Quiffik nodded. He was stricken dumb with astonishment. Walk! Alone, through unexplored territory, on an alien planet! For half a day! It was everything he'd hoped for. It was too much to believe all at once.

It seemed like only moments later when he stuck his head up through the surface of the lake and took his first cautious look around. His pressure suit helmet was a clear bubble, affording him a full panoramic view of the surroundings. The tall, blood-green plants the biologists had described grew all around the lake, hemming it in completely with their thick foliage. Quiffik looked for movement within the forest, but all was still. With a last glance into the water that concealed the ship, he leaned forward and thrashed his way toward shore, pulling himself up onto the bank with one space-suited tentacle.

It took him a moment to get used to standing under plants many times his own height, but Quiffik had never been claustrophobic, and besides, the plants looked solid enough. He could see where a few had fallen over, but that seemed to have been a long time ago, judging by the undergrowth that surrounded them. It was unlikely that the big plants posed any threat no matter how awesome they seemed. In fact, they should provide excellent cover.

Quiffik turned his suit radio to the flyer's channel with a flick of an eating tendril and said, "Calling Raffid. This is First Engineer Quiffik, calling Raffid."

"Raffid here," Raffid's voice answered in his helmet. "Where are you?"

"I just left the ship. Let me get a fix on you here. Send the homing signal."

"Homing signal," Raffid acknowledged, and a soft monotone sounded in Quiffik's ears. A holographic meter at the base of his helmet swung around to point off to his left.

"Okay, I've got you." The tone stopped. Quiffik turned until the pointer aimed directly in front of him, then, with his lowermost eye on the direction finder and his upper two on the forest, he headed off into the trees.

He was so used to wearing his pressure suit that it hardly hindered his movement at all. It fit snugly, and though the higher pressure of Quelch-normal air kept it inflated a bit, it was still easier to move here than in space. And with air on both sides of his helmet, he could hear almost as well as if he wasn't wearing the suit at all.

He said into the radio, "So how did you lose the polarizer?"

Raffid sounded apologetic. "Oh, it was my own stupid fault. You told me not to push it too hard. I was taking pictures of one of the native cities when a couple of their flyers spotted me. One of them fired some kind of missile and I panicked, jammed the power on full lift without thinking. It about shook my eyeballs out before I could shut it down

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again, and all I could get out of it after that was about half a gee. I lost the other flyers, but I could only glide until I came down. Even in this low gravity half a gee won't hold you up for long. I had to feed it power again to make a soft landing, and now I can barely get any lift at all."

Quiffik nodded to himself. "Sounds like the polarizer all right."

"You think you can fix it?"

"Oh sure. It's only a phase problem. If it had burned out completely you would have fallen like a rock. All you've got to do is tune it up to resonance again and it'll be as good as new. If Trovven wasn't so worried about starting a plague you could do it yourself, but the tuner's in the engine compartment."

"Might as well be on Quelch then. Trovven's mad enough already without me opening up the bubble too. I think if that missile had hit me he'd have been madder about possible contamination of the air than about the attack."

Quiffik snorted. "Probably. You don't think there's much chance that those flyers will spot you again, do you?"

"Hardly. I'm buried in a bunch of vegetation taller than the ship. They'd have to be straight overhead to even catch a glimpse of me. But it might be a good idea if we didn't use the radio. They could pick up on our signals."

"Right. I'll see you when I get there then. Quiffik out."

"Enjoy your walk. Raffid out."

Quiffik began to concentrate on doing just that. He looked at the vegetation around him. He was no biologist, but he could see that they all seemed to be based on some sort of rigid tentacle system, with two major variations. On most of the larger plants the tentacles ended in thousands of flat things that rustled in the breeze, but some had tentacles that ended in an equal number of sharp points. The ones with the flat things greatly outnumbered the others, though. As he watched, an animal of some sort launched itself from the top of one of them and flew away. Quiffik began to notice other animals high above him too. There was room there for a whole ecosystem above the ground! He walked onward, fascinated.

Eventually he came to another lake, much smaller than the one that hid the ship, but still large enough that he had to detour around it. When he was about halfway around, he noticed the sun glinting off something shiny just ahead of him. He stepped back into the forest and advanced cautiously until he came to the source: a dwelling of some sort, facing out over the lake.

He watched it from behind a thick plant stem until he was certain that none of the sentient aliens was near, then circled around it once, staying hidden as much as he could by the forest. The place looked deserted. He finally decided to risk a look inside, so he sidled up to the building and stuck a cautious eye up over the edge of one of the windows. He had to stretch to reach that high.

Inside was all one room. The wall facing the lake was all glass; it let in plenty of light to see clearly. There were no aliens inside either. Quiffik recognized some of the furnishings: a bed in one corner, a table surrounded by what had to be chairs for creatures with no hind leg, and softer-looking chairs of

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similar design facing a stone hole in one wall. Other objects made less sense, but were no doubt useful to an alien. Quiffik maneuvered around for a better look.

He found the door easily enough, though it was twice as tall as a Quelch and the latch was much trickier than it needed to be. He stepped inside, his sense of wonder edged with the spice of fear.

He looked around him, not sure what he was looking for. He noticed a group of photographs on the wall opposite the door, and went to investigate them. Most of them were of aliens, either standing in front of the house or floating in a small boat on the lake, or holding some sort of aquatic animal at the end of a cord. Quiffik tried to quell his revulsion at the alien forms and study them carefully.

Beside those was a group of four pictures in a row that obviously belonged together, though what they signified wasn't at all obvious to Quiffik. They were all taken from inside the house, out through the glass wall toward the lake, but each one was different from the others. The photographer had evidently been using color filters, or maybe the aliens' eyes were sensitive to a wider spectrum than Quiffik's, but the color balance on the plants was off in one photo, and another looked like it was taken with X-rays. Quiffik looked at them for a moment, shrugged, and moved on.

He spent a few more minutes searching through the house, identifying eating utensils and clothing and various other household items common to both Quelch and alien, but eventually his apprehension at the thought of the aliens returning home became too much for him and he went back outside, re-latching the door behind him. Rescuing Raffid was first priority anyway; perhaps later when they had both returned to the ship he could come back and look at things more thoroughly.

He checked his direction finder and strode off into the forest again, confident that his discovery would cause a stir back on the ship. He began to recite one of his own poems as he walked, one that he had written when he was first considering going on the expedition.

The ground began to slope downward after a while, and Quiffik followed his direction finder into a long, wide canyon. He was letting himself be overwhelmed by all that he saw, filling his mind with sensations to carry back to Quelch in verse. He tried to store every detail, knowing that everything he remembered now would be priceless when he got home. The others on the expedition would carry back technical reports, but he, Quiffik, would bring back the *flavor* of this place. He could feel his whole life coming into focus in this moment, this afternoon trek on a planet light-years away from home. Everything he did for the rest of his life would be affected by this day. He would become famous. Even Trovven would—

He froze. Something moved in the brush ahead of him. He stood perfectly still as two small, black, fur-covered creatures bounded into view, one chasing the other, obviously in play. The one in front nearly crashed into Quiffik before it spotted him. It skidded to a stop, the other one ran into it from behind, and they both wound up in a heap at Quiffik's trod-pads.

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They scrambled up and ran back the way they had come, making a kind of surprised yelping sound as they ran. Quiffik chased after them, delighted. They were the very essence of humor. Playful little fat creatures knocking one another about—he had to see more of it.

He burst through a patch of foliage into a clearing just as they disappeared behind a big—uh oh. He should have guessed that they were younglings of some sort. And if this was what they would grow up to be, then Quiffik didn't want anything more to do with them. Or it. He backed up slowly, reaching for his reaction pistol with one tentacle while he searched for something to hide behind, but he was too late. The creature raised up on its hind appendages, emitted a deep roar, and charged.

It hit him straight on, smashing him to the ground and ripping at his suit with enormous claws. For a moment they were a snarling, screaming, writhing ball of action, then sudden Quiffik felt the air puff out through a rip in his suit and a flash of pain tore through his side. They both stopped thrashing, the creature evidently startled by the rush of air, Quiffik expecting death at any moment. He heard the suit's emergency beacon begin to wail.

Raffid was shouting something over the radio, but Quiffik missed it in his struggle to pull his pistol out from under him and fire. It was only a reaction pistol, used for maneuvering in space, but it generated a hot flame, and it was the only weapon he had. Quiffik sprayed it across the creature's face. In an atmosphere the pistol gave off a roar almost as loud as the creature's cry of pain and rage.

The noise and the heat was too much for it; the creature turned and fled, followed by its two little ones. Quiffik tried to get up, but something felt broken inside. He saw the rip in his suit and the blood beginning to ooze out onto the ground. His last thought before he fainted was that Trovven was going to be very mad about that.

He woke up in the ship's infirmary, a tube stuck in one tentacle and bandages wrapped completely around him. As soon as he moved, Raffid appeared at his side.

"Don't try to get up," he said. "How do you feel?"

"Uh . . . alive," Quiffik said, surprised. "How did I get here?"

Raffid looked embarrassed. "I—uh—I brought you back."

"You? but the flyer was—how did you—?"

"I defied orders and opened the bubble. I'm afraid I didn't do the polarizer any good. I didn't know what to adjust, so I twisted everything I could find until it flew." He stopped, then went on. "I'm sorry about this. The whole thing was my fault."

"Nonsense," Quiffik said. "It was my own stupidity." He changed the subject before Raffid could protest. "How did Trovven take it? I bet he was pretty upset."

"A little," Raffid understated. "We're both in quarantine until he's sure we didn't catch anything from out there."

Quiffik said, "I expected as much. What about outside? Did we—?"

"No telling yet. But I wouldn't

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worry. We've had test animals living in our air since we got here and it hasn't hurt them yet. I don't think what few organisms we let out can hurt anything. The alien organisms seem to be tougher than ours anyway."

The following weeks seemed to prove Raffid right. Searchers found and watched the animal that had attacked Quiffik, and aside from the burns on its face it had suffered no ill effects from its meeting with a Quelch. The burns eventually healed. The creature grew fatter. Its two cubs continued to be playful.

Quiffik healed quickly also. Neither he nor Raffid caught any alien diseases, but Trovven kept them in quarantine anyway, possibly out of spite. Raffid nearly tore out his eating tendrils in frustration; all the scientific discoveries were going on without him.

The planet swung on in its orbit. Outside the days were getting shorter as the rotational axis began to tilt away from the sun. The average temperature began to drop as the meteorologists had predicted it would, and the moisture began to precipitate out of the atmosphere in a few brief but heavy storms.

Then the plants began to die.

It happened slowly at first, just a few of the smaller ones shriveling up and growing brittle, but within a week of the first observed case it had become an epidemic. It wasn't confined to the areas Quiffik and Raffid had contaminated, but seemed equally severe everywhere. Long-range surveys discovered that the disease was spreading southward over the entire planet, evidently carried by global winds. It was affecting only the plants, and only one of the two major types of plants at that, but the biologists were having little luck in isolating the responsible pathogen. They had never really understood what kept the alien plants alive in the first place, so trying to determine what killed them was doubly difficult. They were certain that some Quelchie organism was involved, but all of the cultures came up negative. Specimens from Quiffik and Raffid grew only the most ordinary flora, and healthy alien plants exposed to them refused to die.

And much to Quiffik's dismay, neither did he. It looked like he was going to survive to become the greatest villain in Quelchie history, and have to go home to tell about it himself. His only consolation was that not everything was dying. A few of the small animals had begun to hoard food, and some of the winged ones were flying to unaffected areas, but other than that the animals hardly seemed affected yet at all. Perhaps they might still find a way to survive.

Raffid destroyed that hope, though. Ironically, he was trying to cheer Quiffik up at the time. He was talking about his own ecological studies.

"Well," he said, "at least I'll be able to trace the food chain throughout the whole ecosystem now."

"How's that?" Quiffik asked.

"Simple. I just watch for starvation. The animals who starve first will be herbivores, and the next ones will be primary carnivores, and then secondary, and so forth."

"You mean everything's going to die anyway? It's not just the plants?"

"Of course not," Raffid said, sur-

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prised that Quiffik hadn't seen that for himself. "Everything's interconnected. When you upset a food chain as badly as we've upset this one, there's no hope for it. We've killed the food supply, so of course everything it supports will die too. Even the decomposers will go eventually, I suppose."

"But the plants that aren't dying—won't they support some kind of life?"

"Oh, it's possible, but hardly likely. I imagine any that *can* be eaten *will* be, long before they can reproduce. There might be a few inedible ones left, but I think all the animals are doomed."

Quiffik writhed his tentacles in agony at the thought. "Isn't there something we can do? Shouldn't we try to warn the sentient race—try to help them? If they knew what was causing all this, maybe they could stop it. Don't you think?"

Raffid nodded. "Trovven has talked about it, but he doesn't want to contact them until we understand their language better. There are still a lot of concepts that we just don't understand, and he thinks that there might be some danger if we go about things wrong. From what we've seen, these creatures are a pretty vindictive sort, and they might conceivably try to take revenge on Quelch."

"So we're just going to sit here and watch the planet die?"

"We're doing everything we can. The disease hasn't reached the other hemisphere of the planet yet, so we've been able to get a few uncontaminated specimens. We might yet discover what's causing this in time to prevent complete annihilation."

But even then, Quiffik thought, mil-

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lions of innocent creatures will die. He thought of his krem, also killed because of his own stupidity. Trovven had been right all along. But he should have thrown Quiffik out the airlock as well.

He thought of the poems he had meant to write. They were a hollow mockery now. What good were words when a planet was dying? What could they possibly do but add to the sorrow? He had not only killed a planet; he had killed his own reason for being.

Quiffik thought about it deep into the night. When he could no longer think, he got up and found some pills to help him sleep. It took a long time to wash down the entire bottle.

He knew he had not taken enough when he began to dream. He was back in the alien house by the lake, only this time he was hiding from Trovven, who was rushing the barricaded door from outside and screaming in rage. Quiffik was trying to hold shut a gigantic rip in his pressure suit, all the while searching for some kind of weapon, anything to defend himself with, but everything was incomprehensibly alien to him. He *knew* that what he searched for was somewhere in the house, but he couldn't tell one thing from another.

"Murderer!" Trovven screamed from beyond the door, his cries blending with the ominous hiss of breathing air from Quiffik's suit. "Open the airlock! That's an *order*, Quiffik!"

Quiffik stumbled backward away from the door until he was up against the far wall. One of the pictures fell off onto his helmet and clattered to the floor. It showed himself holding a dead krem by one tentacle, grinning stupidly into the camera. He leaped up to dash the others from the walls, but stopped when he saw the four photos of the lake. They were unchanged. The first still showed the lake fringed with the blood-green trees, much as it had looked when Quiffik first found the house. The second was still mottled with strange colors, but Quiffik recognized them now. The third one was a familiar sight now too—all the plants dead. But the fourth showed the same plants beginning to grow again. Quiffik turned to look out the windows. They were growing now. He looked back at the photographs. Growing, dying, dead, and growing again. In that order. But the photos were taken before any of them had died. Unless . . .

Could an alien die twice?

Quiffik reached up and cautiously removed the photo mural from the wall. Holding it before him like a shield, he went to open the door. ■

● The "discipline" of social science consists not in objectifying persons with our bloodless gaze, but alternating between a real concern for people, a genuine attachment, and detaching ourselves long enough to ask if, despite all our desires, the hypothesis remains unconfirmed and the situation unimproved.

Charles Hampden-Turner, *From Poverty to Dignity*

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the reference library

By Tom Easton

Project Pope, C.D. Simak, Ballantine/Del Rey, $2.75, 313 pp.
The Windhover Tapes: An Image of Voices, W. Norwood, Bantam, $2.50, 211 pp.
Lava, K. O'Donnell, Jr., Berkley, $2.25, 232 pp.
The Coming Event, E.C. Tubb, DAW, $2.25, 160 pp.
Elephant Song, B.B. Longyear, Berkley, $2.50, 234 pp.
Worlds, J. Haldeman, Timescape, $2.50, 239 pp.
Birthright: The Book of Man, M. Resnick, Signet, $2.75, 280 pp.
Small World, T. King, Signet, $3.50, 312 pp.
The Identity Matrix, J.L. Chalker, Timescape, $2.75, ? pp.
Helliconia Spring, B.W. Aldiss, Atheneum, $15.95, 368 pp.
The Selkie, C. Sheffield and D. Bischoff, Macmillan, $14.95, 375 pp.
Flying Saucers, I. Asimov, M.H. Greenberg, and C.G. Waugh, eds., Fawcett, $2.95, 352 pp.
Science Fiction A to Z, I. Asimov, M.H. Greenberg, and C.G. Waugh, eds., Houghton Mifflin, $?, ? pp.
Galactic Tours: Thomas Cook Out of This World Holidays, D. Hardy and B. Shaw, Proteus (dist. by Scribner's), $15.95, 96 pp.

Clifford D. Simak is, I often feel, an old friend. I've never met him, but I've read most, if not all, of his books over the years. With every one of them, I've been struck by a sense of immense friendliness. It comes partly from Simak's constant concern with rural settings and frames; even when he visits a city or a spaceship, his focus is on life, on being, and his characters are marked by the best of intentions coupled with a certain perplexity in the face of reality. I've heard him called a pastoral writer, but I think that misses the point. He *is* a folksy writer, a neighborly one, one whose concerns lie in the day-to-day instead of the cosmic, one who writes of hobbits, not men. Somehow,

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even when his themes are cosmic, he renders them in terms of the day-to-day. To him, all living things are neighbors. There is less of evil in the worst of us than of simple bad manners.

Unfortunately, it is all too easy to doubt Simak's vision of the universe. We can wish he were right, but cynicism forbids. Yet to me, his very idealism makes him seem a very congenial fellow. It even makes him worth taking as a model, and I please myself whenever I find the rhythms of my sentences or the flavor of my stories echoing his. They do so echo, too, for I have had readers say to me, "You like Simak, don't you?" They can tell.

Why do I talk like this to you now? Tonight I go to the Pittsfield Town Library, about an hour away. It's National Library Week, and I've been asked to speak of book reviewing and science fiction. Now that I've rehearsed my thoughts of Simak, I just may include them in my talk. I had been planning to speak of the hazards of this trade, of hate mail and the like, and to add a few remarks on what SF should be or do that it is not. I had even been planning to toss out a few opinionated evaluations of the genre's kingpins, just to show why I do sometimes get hate mail.

More to the point of this column, I talk to you of Simak because I have his **Project Pope** before me. It begins as Jason, a doctor, flees political upheaval. He boards a ship of pilgrims bound for an isolated world where a colony of robots and humans seeks the ultimate religion with the aid of a supercomputer, the Pope of the title. Aboard ship, he meets Jill, a woman writer seeking the facts behind a rumor and hoping to gain a best-selling exposé. On the planet, Vatican-17, Jason and Jill are recruited for the project and become fascinated. They meet Dekker the hermit and his wispy alien familiar. Together, they find ways of traveling to hitherto unreachable worlds, discover a threat, and remove it.

The tale has both pastoral and cosmic elements. It also has that tone of rurality some critics have lately objected to. The robots might as well be laid-back flesh and blood. The people consider their actions and avoid frenzy. The aliens, except for the villain, are friendly in a neighborly way. The complexities we curse in life today abdicate in favor of more personal interactions.

At the center of this novel is a curious use of robots. Simak has them—man's creations—seeking man's creator, as rapt in religion as ever was any monk. Perhaps they take up this quest on his behalf, just as Lazarus Long and others have sought Heinlein's lost youth. Whatever, this is not the first time Simak has entrusted religion to his robots. A decade ago, for instance, in *A Choice of Gods* (also now out from Ballantine), a book quite reminiscent of *City*, he had a handful of monkish robots tending that religious garden humans had abandoned. In *Project Pope*, he lets them go further. The monastery is larger, the subject is all possible religions, and the goal is not maintenance, but discovery. Both books gain some appeal from the incongruous juxtaposition of machinery and God. But I doubt very much that Simak makes the juxtaposition solely for flash. He addresses serious questions and he offers, if not answers, at least worthy commentary, not the least of which lies in his neighborly style. Did not Jesus of Nazareth once say that the core of godliness is to love thy neighbor as thyself?

I need hardly add that I recommend Simak's books strongly. By all means, buy and read *Project Pope*.

* * *

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Warren Norwood's first novel is **The Windhover Tapes: An Image of Voices.** It begins a series of at least three novels. It is interesting and readable, but the reader's involvement is at arm's length. The protagonist, Gerard Manley, is a "contract diplomat" who roams the universe in a sentient ship, negotiating treaties and resolving crises. At some time in the past, he apparently screwed up so badly that his Fed employers wiped his memory. The wipe wasn't perfect, though, for his subconscious remembers and sends him intriguing dreams of life as consort to the Queen of the Ribble Galaxy. His past thus intrudes on his love for the three-breasted ShRil, and he seeks a resolution.

So much seems to apply to Norwood's entire series. *Tapes* ends when Manley has left the Fed's employ to become a roving researcher and recruiter for a new universal university, been kidnapped by a representative of the Ribble Queen, and been rescued. Later volumes will pursue the mystery of his past.

I said the reader's involvement is at arm's length, didn't I? Why? The title says it. The book is told as a series of diary entries, or images, taped in the memory of Manley's ship, the Windhover. We see nothing that has not been filtered through Manley's mind, no direct action by others, no direct dialog. True, we are used to seeing every story filtered through its author's mind, but here we have the appearance of two layers of filtering. Of course, the two are really one, but they don't feel that way, and the story lacks immediacy. That it remains as readable and as interesting as it is, is a tribute to Norwood's skill and to his potential for the future.

Should I say anything about Kevin O'Donnell, Jr., and his *Journeys of McGill Feighan*? Book III, **Lava,** is out now, and like its predecessors it's lighthearted, ingenious, and readable. But it isn't terribly complex or unpredictable—you can know enough about it from its blurb and from having read *Caverns* and/or *Reefs*. As a baby, McGill was swallowed and held for a few days by a giant mollusc, supposedly a representative of the Far Being Retzglaran, who may or may not be God. As a result, the Organization, an interstellar Mafia, grew interested and began trying to kill or recruit him. Its interest did not lessen when McGill turned out to be a Flinger, one of those talented beings on whom the galaxy's teleportive commerce depends.

Yet McGill himself is as confused about his history and destiny as the Organization. The series chronicles his adventures as he tries to learn, on alien worlds and despite the Organization's pursuit. In *Lava*, his best friend is framed and hounded to death. The same frame begins to settle around McGill, and he flees to a world of intelligent cacti with his sidekick, the infant Sam, a dragon-like Rhanghan. There they fight off an Organization attack and attain a dubious neutrality, even as they learn a little more about the Far Being's power to set up people and conditions to deal with far-future crises. Clearly, McGill *has* a destiny, but what it is is impossible to guess. Presumably O'Donnell knows.

Just maybe O'Donnell has a *looongg* series in mind for McGill. He certainly has the material. But even the longest series must reach an end sometime, which brings me to E.C. Tubb's latest Dumarest tale, **The Coming Event.** Dumarest, voluntary exile from Earth, has been trying to find his way home through 25 previous books. Along the

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way, he has earned the enmity of the Cyclan, an organization of cyborgs, and many of the books have ended with the Cyclan hot on his heels. In #25, however, he fought them off and stayed put, so that *Event* opens with Dumarest still among the Terridae, a group that also yearns for Earth. He is using them to prepare a search, but before progress can begin, he must fight off another attack. He does so, gains a ship, and finds among the Terridae what may be Earth's coordinates. Thus equipped, he leaves once more, but now we can believe the end is in sight. One more book, at most two, or three, and Tubb will be free to write another story.

OY! That library visit! It is now the day after I started this column. I went, and I just made it before the car's alternator quit completely. I shrugged, said, "What? Me worry?" and went in to chat with my audience of half a dozen people—the librarian, her assistant, three women, and an eleven-year-old girl. Had fun, too, and when we were done the librarian gave me a ride home. Seems her route takes her right past my house. Lucky. This morning, my wife drove me back to the car, I got it into a garage, and I learned all I needed was new brushes. I lost all of a double sawbuck, and a morning's work on this column. Fortunately, the library's "honorarium" will cover the repair and buy a sixpack to boot.

Do I hear someone asking why my audience was so small? The librarian swears—and she *is* a preacher's wife! —that many more would have come if it hadn't been that everyone was in meetings around town or away, on vacation for the local schools' spring break. I believe her. Don't you?

But back to business. Barry B. Longyear has done two books concerning his world of Momus, settled by a marooned circus. *City of Baraboo* told us how the circus left Earth for the stars, only to crash. *Circus World* showed us the strange culture the circus's survivors built over the generations. Now we have **Elephant Song,** which fills in the years immediately after the crash and shows Momus's culture beginning to emerge. It is a tale of surviving, making do, and making out. It is also a tale of loss, for its compass is defined by the circus's elephants: the tale ends when the last one dies. And die they must, for though the circus calls all pachyderms "bulls," there's not a bull elephant on the lot. Only the cows will cooperate reliably with humans, and hence they are doomed on Momus. So too are the bullhands, left with less reason to live than any of their fellows.

Does it sound good? Then I'm sorry to disappoint you by adding that *Song* doesn't seem up to Barry's par. It isn't quite as much fun, and while Barry has tried to play off tragedy against hope, shadowing his tale with a visibly laborious future and setting up the bullhands as fallen angels, he has not written the moving story I suspect he had in mind. What is the problem? Perhaps he simply doesn't pay enough attention to the tragedy. Maybe he rides too much on the surface, which is fine enough for "light entertainment," but not quite enough for tragedy.

Or maybe I just had a touch of indigestion when I read it. I *did* enjoy the book.

Joe Haldeman's **Worlds** begins "a major SF trilogy," according to the cover blurb. Maybe. In an often offhand, flip style, he tells us what happens when Marianne O'Hara, sexually free daughter of an orbital colony (a World),

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goes to Earth to touch up her education. Amidst squalor and decadence, she falls in with the Third Revolution, finds love and love again, marries, is kidnapped, gets jammed in a crack when World War I—excuse me! I mean III, of course —begins, and, as Earth and Worlds boycott each other, she escapes homeward on the bow-wave of nuclear chaos. The world is dead. Long live the Worlds.

Clearly, with a change of venue to Europe, the book could have been written in 1915 or 1940, when the Grand Tour wound up every respectable Rich Kid's education and the Nihilists or Communists or Fascists were lying in wait like spiders. But it's still fun stuff, a quick read, even thought-provoking at times, despite the fact that Haldeman's future has been fondled by a good many SF hands. But what in the World will Haldeman do for an encore? This is a trilogy, remember?

(I couldn't resist that last. Sorry, Joe. Readers—let it be known that Earth is not totally destroyed, despite the book's back cover, and of course the Worlds offer plenty of scope for two—or more—additional volumes.)

A little while ago, I reviewed Mike Resnick's *Soul Eater*, saying the style was on the crude side, but the story itself was art. He reacted, grumpy at the "crude" but happy at the "art," and sent me his latest, **Birthright: The Book of Man.** It's a rise-and-fall book, human future history from obscurity to extinction, and it's well done. The style is less simple than in *Soul Eater*, which lets me think that simplicity might have been deliberate (it did fit), and the story is more ambitious and more abstract. Yet, as a story, it hangs together only in a thematic, philosophical way. There is no continuity except that of history, a lack that has weakened Stapledon, Asimov, and every other posing prophet.

The story? Humans explode into space. They dominate, exploit, and conquer every alien species they meet, building an ample store of hate which eventually brings them down. The story is told as a series of "demonstrations," almost short stories, that show the role in history of various segments of society—among miners, media workers, artists, warlords, etc.

Mike's vision is hardly impossible. It may even be likely, or true. Certainly history justifies it. But there is a sanguine shortage of human-human conflict until near the end. This makes the vision suspect. At the same time, the cynical realism of Mike's stress on the human drive to dominate and the poetry of humanity's just deserts do make that vision acceptable.

He promises more books later. I'm looking forward to them.

Tabitha King's **Small World** is an interesting book for two reasons: her husband is Stephen King, and this first novel shows a definite kinship of style; and it is *not* a suspense novel, despite its blurbs. It's an SF novel, with a totally reasonable working out of its premise's implications. It won't scare your socks off unless you're paranoid to begin with.

The premise is a device that can shrink people and things to doll-size. Given that, King asks what kind of person would use the gadget on anything remotely human, and goes on from there. The device and its naive inventor fall into the hands of an immature, degenerate, doll-house freak who uses it for revenge and to decorate her miniature White House with genuine *objets-d'art*, suitably reduced. She is evil, but her evil is human and natural, not supernatural. The inventor is not evil at all,

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only naive, stupid, blind, and inadequate, though he does manage to minimize the damage at times.

The story's open ending is an intriguing reflection of legend, yet it is not so cute as to ruin the book. King's restraint there is admirable and her book well worth attention. It is solid entertainment. However, from the viewpoint of SF, it does have one flaw: When things are miniaturized, they apparently reduce in scale in all respects—even in mass. The true-blue, orthodox SF writer (Niven, say, or Pournelle) would have given us some explanation of where the mass goes and why it doesn't appear as a blistering blast of energy. The lack of this explanation forces us to say that *Small World* may be more fantasy than SF. But it's still a good story.

In **The Identity Matrix,** Jack Chalker offers us an invasion by aliens who can switch minds with us—you can never know whether your friend is *really* your friend! There are two groups of aliens, one that switches with technological aid and one that does it without. They are enemies, and Earth is a "Less Developed Nation" to be recruited by one side or the other, though its natural tendencies are clear.

Hero Victor runs into the aliens and is switched into a titillatingly female body. S/he then gets drafted into a top-secret, underground defense project that is mastering the switching technique and its educational spin-offs. Eventually, s/he saves Earth from destruction and all is well.

The book is fun and fast-paced. With a much lighter touch, it might have been a replay of Thorne Smith's *Turnabout* (a hilarious sex-change yarn!). As is, its greatest strength may lie in what it says about how gender can affect identity, for here it escapes triviality.

* * *

Brian Aldiss's **Helliconia Spring** is Book One in a series set on a world with a 2600-Earth-year year and extreme climatic shifts. He proposes to match the stages of civilization to seasons, on a stage watched by Earthlings for entertainment. On Helliconia, humans confront aliens, the elements, and each other as they rise from winter's savagery with the yeasty speed of spring. They rise too quickly, though, and Aldiss's facile reliance on single characters with the innovativeness of Edisons does not help belief. His careful attention to detail makes his world come alive, but even so I found the story less than exciting. It wouldn't be fair to say I found it boring, but I did wish it would hurry up and end.

The story is collecting raves. Let me object. *Spring* is imaginative, detailed, careful SF indeed, clearly by a master of the field, but it is also stodgy. It may thus be a grand critical, academic success, but I suggest you give it a miss. You'll have more fun with Gene Wolfe's Book of the New Sun tetralogy, which is more imaginative, more detailed, and more careful, and not stodgy at all.

The Selkie is Charles Sheffield's and David Bischoff's maiden voyage into the mainstream. It's SF, but it is also horror and gothic. It offers us a rational explanation of Scotland's selkies, sealmen who breed with human women, and the horror lies in the nature of the breeding. It's good.

In the past few years, Asimov, Greenberg, and Waugh have been turning out an ample supply of theme anthologies, and more are on the way. I have before me **Flying Saucers,** which contains 25 nice stories by Asimov, Budrys, Chandler, Clarke, Garrett,

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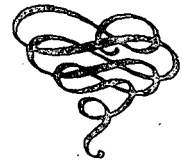
Haldeman, Sturgeon, Swann, and more (including Mrs. Waugh). I also have **Science Fiction A to Z** ("A dictionary of the great themes of Science Fiction")—A is for aliens, art, and autos, D for dinosaurs, H for hyperspace, Z for zoos—with contributions from Zelazny, de Camp, Leiber, Sheckley, Aldiss, Bradbury, and 44 more. This one could be very useful to the teacher, or to the novice fan. With theme-organized bibliographies, it would also answer Mike Ashley's (*The Astounding/Analog Index*) wish for a theme index.

Galactic Tours, by David Hardy and Bob Shaw, is another of those pictorial, you-are-there, future role-plays. And it's a treat. Take a Cook's Tour through the Solar System and around the galaxy. See star-gates, a metal world, dragons, giant fungi, flying cities, derelicts, and more, more, more! Have fun! ■



IN TIMES TO COME

☺ Our December issue might well be called our "exotic astronomy special." It starts two "serials," one fiction, one nonfiction, but both solidly based on real—but decidedly strange—science. The fiction piece is Dr. Robert L. Forward's new novel, *Rocheworld,* which will transport you to a double planet of our neighbor, Barnard's Star, in which the two component planets orbit each other so tightly that each looms huge in the sky of the other and the tidal forces between them become awesome at closest approach. Couple that with the fact that there's a point between them where gravity is zero, and you get some spectacularly bizarre effects—which are of more than academic interest if you happen to be stranded on one planet of the pair while the rest of your exploring party is on the other.

The fact article is "The Blivit in the B-Ring," by Richard C. Hoagland, which turned out so long that it wouldn't fit in one issue's article slot, but so fascinating that I couldn't pass it up. It involves a mystery, you see, concerning something recently found in the rings of Saturn. It's really there, but what it is is still a subject of much doubt. The possibilities start far out and get progressively more so.

We also have an appropriately seasonal story by Thomas R. Dulski, plus as much other fiction as we can get in, likely including contributions by Timothy Zahn and Ray Brown.

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brass tacks

Dear Dr. Schmidt,

I read your January 1982 editorial with some interest, because in the past few years my own ideas about morality have changed a great deal. These changes were the result of being involved in a well-known religious cult for two years and then working to get two people out of the same group by illegal means, the same means that had been used to get me out.

When I first went to college, I was a total agnostic, pretty much turned off by and distrustful of the idea of religion. What happened that changed that was I met a woman who was interested in Eastern religion, and in hopes of winning her favor I started reading up on it myself, especially the books written by the founder of the cult in question. Her interest in the subject died in the bud, but I found that mine only increased. Those old Hindu myths contain some excellent stories, and could be used as a basis for some good modern fantasy. I didn't always find their morals convincing, but I enjoyed the reading. Eventually I got a chance to visit the cult's Chicago temple.

The temple was actually an old building that had been used as a warehouse for years before the cult bought it. Here the cult members lived in poverty, yet they seemed deliriously happy. That affected me a lot. I could argue with their beliefs, or their astronomy (the Vedas teach that the Earth is flat, among other things), or their practices, but I could not argue with happiness. So I started taking the religious aspect of their beliefs seriously, trusting myself to maintain skepticism towards their astronomy. I volunteered to work at the temple doing odd jobs and errands while I looked for a full-time job as a computer programmer. When I got the job, I continued to spend my weekends at the temple.

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I lived with my parents at this time, and they were somewhat alarmed when I began to spend two hours a day chanting mantra. Still, they thought I would get bored with it one day, and they liked that I was making new friends. I seemed to get some enjoyment out of the temple, so they tolerated the chanting. Unfortunately, the rules I was following about not eating meat and avoiding other worldly amusements put some distance between myself and the people I knew before the cult. If I wasn't allowed to do the things they liked to do I couldn't be much of a friend to anyone outside the cult.

For over a year I kept on like this, living and working in the outside world while at the same time getting more and more involved in (and dependent on) the cult. One day the guru said that I would have to decide between the two worlds. He wanted me to board a plane for Texas without telling anyone where I was going, there to become a full-time member. After six months, when my faith was strong, I could return to Chicago and see my parents again. I had enough sense to reject that offer, but not enough to just walk out of the place and never see it again. I had invested too much of myself in those people and their lifestyle to give it up entirely. Still, the heat was on. Gurus are not refused lightly. Everyone at the temple badgered me until it seemed that I would have to decide one way or the other. I was really wondering if I would ever be happy as a computer programmer. Then the guru made his final offer: I could be his disciple if I continued to work at my job but gave half of my salary to the temple. I could live outside the temple, but I would have to attend all morning and evening programs (which meant that every waking hour outside of work would be spent at the temple, since the morning program starts at four A.M. and the evening program ends at nine). I agreed to this. At that time I had no idea of what the life of a full-time member was like. I soon found out.

For one thing, I did some fund raising on weekends. I sold phonograph records, religious books, and little paper flags in parking lots, always representing myself as working for a drug halfway house in Chicago. Some of our fund raisers worked out of wheelchairs or posed as deaf-mutes to beg for money. Short-changing was universally practiced. The idea was that if you could trick someone into giving money to God's cause he would benefit spiritually.

The indoctrination was constant. We only slept six hours at night, if that, and we had to sit through (or dance through) four hours of indoctrination and ritual before our low-protein breakfast. In the evening it was the same thing over, followed by cookies and warm milk and then off to bed.

People always ask me why I didn't leave on my own. Actually, I was pretty happy there. Everyone claimed to love me, whether they did or not. They were not stupid people, either. The president of the temple had been the vice president of an insurance company. The guru's servant had taught acupuncture to doctors in Iran. The fellow who taught me the art of short-changing had been a mechanical engineer. There is a whole society within the cult composed of scientists and Ph.D.s who put on scientific conferences and wrote monographs against evolution. They even published an interview between the founder-guru and our own Gregory Benford. It wasn't stupidity that got us involved with the cult; it was idealism and the callowness of youth.

I couldn't leave the group on my own.

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Fortunately I didn't have to. My parents and a group of ex-members of various cults kidnapped and deprogrammed me. Basically this meant that I was confined for three days away from the group. I was not allowed to meditate, but there was no torture to get me to renounce my beliefs, either. Since the people doing the deprogramming were ex-members of cults, and one was an ex-member of my own cult, I could not lie to them about what I had been doing. All they did was ask me simple questions like "Isn't it wrong to pretend to be from a radio station when you go out selling records? Isn't it wrong to short-change people who give donations? Do you really think your own parents are demonic?" As simple as those questions were, it took me three days to stop parroting the cult's answers to those questions. As it was, there was a lot that I had done in the group that I could be ashamed of. Yet there was no place for shame in the cult doctrine. The money, the people God needed for his program were there, and since He already owned everything, we could take them by any means available. Not only was it permissible; it was our sacred duty to do so. It was not until they attacked the shallowness of life in the cult that the shell I had built around my mind began to crack. While most of us had been lonely before joining the cult, that aloneness did not end after we became members. There was no friendship in the cult; we were merely team players. We respected those senior to us and instructed those junior to us, praised the hell out of each other when we felt good about the group and reprimanded each other when we didn't. Marriage was a concession to the demands of the flesh, or at best an opportunity to use one's genitals in the service of the Supreme Person. After a couple had the proper amount of children they would live separately, and at the age of five children were sent off to cult schools where their parents could rarely see them. There the children would learn to read English and Sanskrit, study their religion and that perverse astronomy, and learn enough arithmetic to give change incorrectly. It was just a big treadmill, kept going so fast that we didn't have time to realize that we were missing something.

There were many people in the cult I cared about, or wanted to care about; deprogramming made me see that it would never happen. It also showed me a way that I could care about them. There was one person in particular, a girl who had been largely responsible for my joining up, that I had to talk to. Several months later I got my chance. She had been in seven years, but she won't go back. She, too, felt that deprogramming had been a necessary thing for her. After that I heard from the father of a boy going to school at an Illinois college. His friends hardly seemed to know him anymore after he started to attend the cult's Sunday programs. Nobody seemed to know what he was doing. It turned out that the boy had withdrawn from all his classes months before and was living full-time at a temple in St. Louis, allowing his parents to think that he was still attending classes. He was deprogrammed when he came home for "spring vacation," and afterwards he spent a whole summer as a counselor for people coming out of cults.

So who decides that a person needs to be kidnapped? Well, parents know when their child has suddenly lost all traces of his former personality. They know when they are being treated as representatives of Satan. Ex-members also know, and there are no deprogrammers that have not been members of cults themselves at one time. It is not

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a question of hiring a professional torturer to talk someone out of his belief; it is a matter of getting people who have been sufferers themselves to help a person get his mind moving again. Also, deprogramming can only be useful against a group that is so ruthless and immoral (by any definition you like) that anyone would leave it in a minute if he had a minute to think about it. Nothing that was said to me in my deprogramming would have affected me if I had not known it to be true from my own experience. We have all read about how Winston Smith learned to love Big Brother. We have also read how Nehemiah Scudder used the tax-exempt status of religion to create a mass movement that enslaved millions. Such stories need not be written as science fiction anymore. What science fiction writer could have predicted Jonestown?

I am no longer an agnostic, and I think religious feelings can be as valid as any other kind. I am not against any doctrine, even the one I gave up. I would not have the human race live without religion—but with tax laws that made sense, with conservatorship laws that allowed parents to help their offspring get unbrainwashed without committing a felony, we could live with religion and be that much better for it.

I have always thought of *Analog* as the magazine that presented the alternate view, in fiction and otherwise. Thank you in advance for letting me present mine.

J. SIMMONS

Dear Stan:

Enjoyed the June *Analog* very much, particularly Joseph H. Delaney's "Brainchild," which combines good ideas, a significant scientific basis, and excellent characterizations. I'd like to see more from him.

I liked Spider Robinson's "Melancholy Elephants," too—although it was a surprise to see my own name mentioned in the story. For the record, Harlan Ellison and I won our suit against ABC, Paramount, *et al.*, because, I believe, the jury found that the defendants had taken substantial amounts of our words—a couple of full scripts, reams of background material, and outlines of plots—and incorporated them into their own production. It wasn't merely the *idea* of a robot cop that was in question; it was the details of our work. Indeed, the defendants based their case on the concept that ideas cannot be plagiarized (and strongly implied that all science fiction ideas are ripped off from other sources!). But the jury found that there was much more to the matter than simply the basic idea of "Brillo."

Finally, I agree with Joe Patrouch's "Ninety-Degree Error" thesis entirely. Too many critics, including many within the science fiction field, equate complexity with depth. Simplicity is a virtue, in art as well as in science. In fact, without simplicity, you cannot have elegance.

BEN BOVA

Dear Stanley Schmidt,

After reading your editorial on TANSTAAFL (May 1982), I thought you might be interested in what is probably the origin of the free lunch as the illustration of a basic principle in economics.

When I spent a semester at the University of Vienna in 1931, I heard a story about an encounter between Pareto and Schmoller during an international conference of economists at Munich in the years before World War I.

Schmoller belonged to a school of German economists who maintained that the working of any economic system was determined by its institutions

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and that, because different systems had different institutions, there were no general laws of economics.

After Schmoller had delivered a paper arguing his view that there were no general laws of economics, Pareto said to him, "You know this town well. Can you tell me where there is a good restaurant at which one can get a free lunch?" Schmoller replied, "But there are no restaurants like that." Pareto then said, "Well, there is a general law of economics."

MICHAEL LINDSAY

Chevy Chase MD

Dear Stan:

Here's a belated note of appreciation for Ray Brown's "Joe Haynes and the Zeitgeist" in the December 7, 1981 issue. There's a small corps of science fiction writers who can speak knowledgeably on music and the study of music: Biggle, Yarbro, and Sucharitkul come to mind, though I don't preclude others. Mr. Brown joins their company with his story. I was particularly delighted that all of the composers, compositions, and journals mentioned in the story are real and accurately portrayed.

I'm set to wondering, too, to what extent our society treats music (of whatever styles) as merely "entertainment" or "social commentary"? How rarely is it generally perceived that the study of music may be essential in the study of human psychology and physiology? Some of these questions have been taken up by musicologists, whose work ought to be of moment to the social and physical scientists who deal with these matters in their own work.

Broadly speaking, the educated musician is an aesthetic engineer! I look forward to a time when the world's musicologists take their place in general recognition alongside the inquiring minds in other fields. It is for giving us a glimpse of this argument that I must thank Mr. Brown for his story. I hope to see more of him.

MATTHEW B. TEPPER

Minneapolis MN

You will. ■

● To rebel against a powerful political, economic, religious, or social establishment is very dangerous and very few people do it, except, perhaps, as part of a mob. To rebel against the "scientific" establishment, however, is the easiest thing in the world, and anyone can do it and feel enormously brave, without risking as much as a hangnail. Thus, the vast majority, who believe in astrology and think that the planets have nothing better to do than form a code that will tell them whether tomorrow is a good day to close a business deal or not, become all the more excited and enthusiastic about the bilge when a group of astronomers denounces it.

Isaac Asimov

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ISAAC ASIMOV's SCIENCE FICTION MAGAZINE, published monthly. Send $19.50 for 13 issues (includes shipping & postage) to Isaac Asimov's Science Fiction Magazine, P.O. Box 1855 G.P.O., New York, NY 10001.

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HOW TO COUNT WORDS: Name and address must be included in counting the number of Words in your ad. Each initial or number counts as 1 word: Mark Holly, 380 Lexington Avenue, New York, New York 10017: 7 WORDS. Zip codes are not counted. Phone #: 2 Words. Symbols used as keys are charged for. City or State count as 1 word each: Garden City, New York: 2 words. Abbreviations such as C.O.D., F.O.B., P.O., U.S.A., 7x10, 35mm count as 1 word. (P.O. Box 145 count as 3 words) Webster's International Unabridged Dictionary will be used as our authority for spelling, compound words, hyphens, abbreviations, etc. **Please make checks payable to ANALOG MAGAZINE.**

a calendar of analog upcoming events

25-27 October
ACM Annual Conference at Dallas, Texas. Info: William Burns, ACM '82 Chairman, E-Systems, Inc., P.O. Box 26118, Dallas TX 75266.

29-31 October
NECRONOMICON (SF, horror, comics, and fantasy conference) at Quality Inn, Tampa, Fla. Guests of Honor—Andrew Offutt and Marv Wolfman. Registration—$10 in advance, $15 at the door (if available). Info: NecronomiCon, P.O. Box 678, Thonotosassa FL 33592.

30-31 October
FIFTH EDITION: THE BASH (Boston-area Star Trek conference) at the Holiday Inn, Randolph, Mass. Guests—Hal Clement and Shirley Maiewski. Info: BSTA, Inc., Box 1108, Boston MA 02103-1108.

3-5 November
General meeting of the American Physical Society at Philadelphia, Penn. Info: A.P.S., 335 East 45th Street, New York NY 10017.

11-14 November
HEXACON 5 (Central Pennsylvania-area SF conference) at the Brunswick Motor Inn, Lancaster, Penn. Author Guest of Honor—Hal Clement; Artist Guest of Honor—George Richard; Fan Guest of Honor—Harry Stubbs. Art show, hucksters, movies. Registration—$8 until 31 October, $10 at the door. Info: Hexacon 5, c/o Bruce and Flo Newrock, Box 270-A, RD 2, Flemington NJ 08822.

12-14 November
TUS-CON 9 at the Executive Inn, Tucson, Ariz. Guest of Honor—Robert Bloch. Info: Tus-Con 9, c/o SASFFA, P.O. Box 26822, Tucson AZ 85726

12-14 November
ORYCON 4 (Oregon regional SF conference) at Hilton Hotel, Portland, Ore. Guest of Honor—Robert Silverberg. Info: OryCon, P.O. Box 14727, Portland OR 97214.

26-28 November
LOSCON 9 (Los Angeles-area SF conference) at the Sheraton Universal Hotel, Los Angeles, Cal. Guest of Honor—Poul Anderson; Fan Guest of Honor—Milt Stevens. Registration—$17. Info: Loscon 9, c/o LASFS, 11513 Burbank Blvd., Hollywood CA 91601.

26-28 November
MYSTERYKON 7 (Texas SF and fantasy conference) at Houston, Texas. Info: Mysterykon 7, Box 713, Stafford TX 77477.

1-5 September 1983
CONSTELLATION (41st World Science Fiction Convention) at Baltimore Convention Center, Baltimore, Md. Guest of Honor—John Brunner; Fan Guest of Honor—Dave Kyle; TM—Jack Chalker. Registration—$10 supporting at all times. Attending—$20 until 30 June 1982, more thereafter. This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition, the works. Join now and get to nominate and vote for the Hugo Awards and the John W. Campbell Award for Best New Writer. Info: ConStellation, 41st World Science Fiction Convention, Box 1046, Baltimore MD 21203.

—ANTHONY LEWIS

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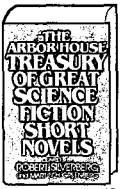

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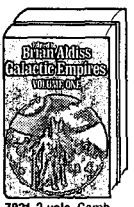

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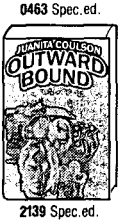

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About every 4 weeks (14 times a year), we'll send you the Club's bulletin, *Things to Come*, describing the 2 coming Selections and a variety of Alternate choices. In addition, up to 4 times a year you may receive offers of special Selections, always at low Club prices. If you want the 2 Selections, you need do nothing; they'll be shipped automatically.

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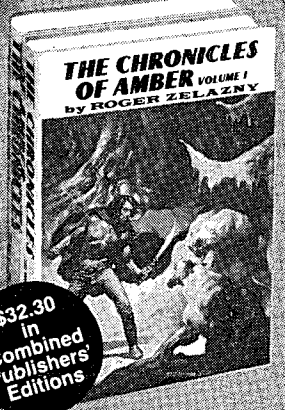

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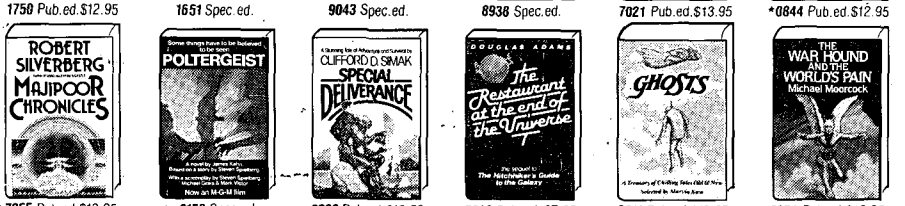

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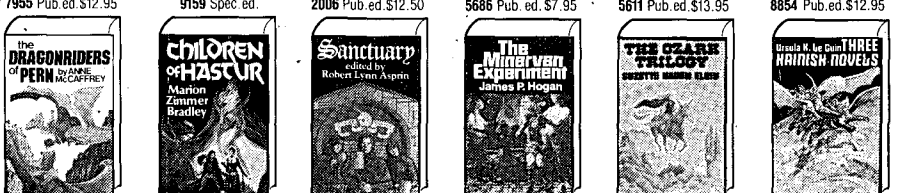

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